

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

IN THE MATTER OF:)

)

LMO 80-4

ALLOCATION OF WATER)

FROM LAKE MICHIGAN)

**OPINION AND ORDER
OF THE SECRETARY**



**Illinois Department of Transportation
Division of Water Resources**

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Illinois
Lake Michigan

AUTHOR

ALLOCATION OF WATER FROM
MICHIGAN: OPINION & ORDER
SECRETARY, LMO 80-4.

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Table of Contents

<u>Section</u>		<u>Page</u>
1.000	Introduction	1
2.000	Jurisdiction	1
3.000	History	1
4.000	Nature of the Proceeding	2
5.000	Chronology of Allocation	8
6.000	Chronology of Rulemaking	9
7.000	Record	11
8.000	The Keifer Report	11
9.000	Need for the Allocation	12
10.000	Storm Water Runoff	13
11.000	Allocation Permits	14
12.000	Classification	15
13.000	Conservation	24
14.000	Water Demands	29
14.100	General	29
14.200	Domestic Use	30
14.260	Consumptive Use	42
14.300	Direct Diversion	43
14.320	Lockage	44
14.330	Leakage	46
14.340	Navigational Make-Up	48
14.350	Discretionary Dilution	51
14.360	Hydroelectric Power Generation	56
14.400	North Shore Sanitary District	56
14.500	Other Reserve	56
14.600	Future Modifications	57
14.700	Total Demands	58
15.000	Duration of Permits	58
16.000	Reporting	58
17.000	Petitions for Reconsideration or Rehearing of this Allocation	59
	Order	
	Appendix A	
	Appendix B	

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1.000	Introduction	1
2.000	Jurisdiction	1
3.000	History	1
4.000	Nature of the Proceeding	2
5.000	Chronology of Allocation	8
6.000	Chronology of Rulemaking	9
7.000	Record	11
8.000	The Keifer Report	11
9.000	Need for the Allocation	12
10.000	Storm Water Runoff	13
11.000	Allocation Permits	14
12.000	Classification	15
13.000	Conservation	24
14.000	Water Demands	29
14.100	General	29
14.200	Domestic Use	30
14.260	Consumptive Use	42
14.300	Direct Diversion	43
14.320	Lockage	44
14.330	Leakage	46
14.340	Navigational Make-Up	48
14.350	Discretionary Dilution	51
14.360	Hydroelectric Power Generation	56
14.400	North Shore Sanitary District	56
14.500	Other Reserve	56
14.600	Future Modifications	57
14.700	Total Demands	58
15.000	Duration of Permits	58
16.000	Reporting	58
17.000	Petitions for Reconsideration or Rehearing of this Allocation	59
	Order	
	Appendix A	
	Appendix B	



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1.000 Introduction

1.100 This Opinion and Order constitute the Department of Transportation's (the Department's) allocation of water from Lake Michigan from October 1, 1980 to September 30, 2020 and an explanation of that allocation. Issuance and entry of an order is required by Section 6 of the Level of Lake Michigan Act (the Act) (Ill. Rev. Stat. Ch. 19, Section 119, et seq.). The findings of fact and conclusions of law contained in this Opinion and the terms and conditions of the Order are based on a combined adjudication and rulemaking proceeding.

1.200 References to the record throughout this Opinion are made with the following abbreviations:

(R.) page number of transcript
(Ex.) exhibit number
(App.) permit application
(File) individual permit file
(Q.) water distribution system questionnaire
(Rules) rulemaking record.

2.000 Jurisdiction

2.100 The amount of water which the State of Illinois is allowed to divert from Lake Michigan or its watershed is set by the United States Supreme Court in the decree in Wisconsin, et al. v. Illinois, et al., Nos. 1, 2, 3 Original, October Term 1966. Paragraph 1 of the revised decree provides that this water may be apportioned by the State of Illinois for domestic use or for direct diversion into the Sanitary and Ship Canal.

2.200 Section 1 of the Act designates the Department as the State agency responsible for the apportionment. Section 9 of the Act requires the Department to adopt rules and regulations relating to the jurisdiction, diversion and utilization, and control and regulation of the apportioned water. The Act was held constitutional by the Illinois Supreme Court [Village of Riverwoods, et al. v. Department of Transportation, et al., 77 Ill. 2d 130, 395 N.E. 2d 555 (1979)].

3.000 History

3.100 The amount of water which Illinois has been allowed to remove from Lake Michigan has been the subject of

permits from the United States War Department and a long series of U.S. Supreme Court decisions [Sanitary District v. United States, 266 U.S. 405, 69 L. Ed. 352, 45 S. Ct. 176 (1925); Wisconsin v. Illinois, 281 U.S. 179, 74 L. Ed. 799, 50 S. Ct. 331 (1930); and Wisconsin v. Illinois, 388 U.S. 426, 18 L. Ed. 2d 1290, 87 S. Ct. 1774 (1967)]. The decree in the last cited case was amended recently by the U.S. Supreme Court.

- 3.200 The Department's first allocation was entered on July 21, 1972 (Administrative Order No. 1, Lake Michigan Allocation). On June 13, 1973 this allocation was set aside and remanded to the Department (North Shore Sanitary District v. Department of Transportation, 72 MR 116, Cir. Ct. Lake County). On remand the Department adopted an allocation for the period from July 1, 1977 until February 28, 1981 (In the Matter of: Lake Michigan Water Allocation, LMO 77-1, April 15, 1977). This last allocation was revised by the Department on September 26, 1977 (In the Matter of: Lake Michigan Water Allocation, LMO 77-2, Decision on Rehearing). The revised allocation was modified by the Circuit Court of Lake County. The circuit court's judgment was affirmed in all respects by the Illinois Supreme Court except for the complaint of the Village of Lincolnshire in 1979 (Village of Riverwoods, et al. v. Department of Transportation, 77 Ill. 2d 130, 395 N.E. 2d 555). On January 15, 1980, the Circuit Court of Lake County ordered an allocation for the Village of Lincolnshire (Village of Riverwoods, et al. v. Department of Transportation, et al., 77 MR 62).

4.000 Nature of the Proceeding

- 4.100 As the preceding sections on Jurisdiction and History indicate, the allocation of water from Lake Michigan is a creature of a long series of U.S. Supreme Court decisions and the Act. If Illinois returned all of the water it uses to Lake Michigan, no allocation would be necessary. The decision to reverse the flow of the Chicago and Calumet River systems (circa 1900) and thereby divert sewage effluent and storm water flows away from the Lake Michigan watershed led to the U.S. Supreme Court litigation. The decisions of the U.S. Supreme Court have been based on a balance between the needs of the Great Lakes states to maintain the levels of the lakes and the needs of the people of Northeastern Illinois for Lake Michigan water. These latter needs

must then be balanced between the demands for domestic uses and the demands for direct diversion into the Chicago and Calumet River systems for dilution of sewage effluent and the maintenance of navigation.

4.200

In the last allocation, the Department concluded that none of the applicant communities had any vested or riparian rights to divert Lake Michigan water. The Department based this conclusion on 1) the lack of any common law riparian rights by shoreline communities to supply public water needs from a bordering lake and 2) the paramount interest of the State of Illinois in apportioning Lake Michigan water as summarized in the Jurisdiction section of this Opinion. In an administrative review of the last allocation, the Illinois Supreme Court stated as follows:

"We turn first to a contention made by several municipalities which abut on Lake Michigan that the Act violates the due process clauses of the Federal and Illinois constitutions, since it accords no priority to riparian and prescriptive rights which they allegedly possess as to water from Lake Michigan.

We entertain some question whether common law riparian or prescriptive rights include a right to the diversion, as distinguished from the use, of the waters of Lake Michigan, as that term is defined in the decree in Wisconsin v. Illinois (1967), 388 U.S. 426, 18 L. Ed. 2d 1290, 87 S. Ct. 1774, or whether such rights may override the paramount interest of the State. The decree itself contains no language requiring Illinois to grant a preferential position to governmental entities claiming such rights. We think it unnecessary to examine further the extent of the rights asserted by these appellants, however, for our decisions in Supervisors v. Village of Rainbow Gardens (1958), 14 Ill. 2d 504, 507-08, and Meador v. City of Salem (1972), 51 Ill. 2d 572, 578, establish that a municipal corporation is not entitled to the protection of the due process clause against the State." [Village of Riverwoods v. Department of Transportation, 77 Ill. 2d, 395 N.E. 2d 555 (1979)]

4.210

Although the Illinois Supreme Court did not rule on the merit of riparian claims, the Department still holds

that riparian rights, if they exist at all, have no effect on the allocation process.

4.300 Section 3 of the Act states in part as follows: ".... the Department shall give priority to allocations for domestic purposes in making allocations to new users of Lake Michigan water ...". Domestic purposes are defined in Section 1.1 of the Act as "all public water supply pumpage and water supplied to commercial and industrial establishments". Section 3 of the Act also states that the Department shall not allocate more than 320 cubic feet of water per second (cfs) for discretionary dilution for water quality purposes in the Sanitary and Ship Canal. The net result of this statutory language can be summarized quite simply. Domestic needs for Lake Michigan water enjoy a higher priority than navigational and sewage dilution needs. Section 3 of the Act also states that the Sanitary and Ship Canal must be maintained in a reasonably satisfactory sanitary condition. Paragraph 1 of the U.S. Supreme Court decree states that any apportionment by Illinois is subject to any regulations imposed by Congress in the interests of navigation or pollution control. Consequently, the Department must recognize the priority for domestic use but cannot ignore the other statutory and judicially imposed requirements.

4.310 The priority for domestic use is hardly a new concept. In 1842 the Illinois Supreme Court reviewed a case involving conflicting riparian users on a small stream (Evans v. Merriweather, 4 Ill. 492, 38 Am. Dec. 106). The upstream user diverted all the water in the stream for the operation of his mill. As a consequence, the downstream user could not operate his mill more than one day a week. The court held that a riparian owner has a right to use as much water as is necessary to satisfy his "natural" wants (quenching thirst, household purposes, and water for cattle). "Artificial" wants (irrigation and manufacturing) cannot be satisfied unless the "natural" wants of all downstream users are satisfied. This case has been cited as the leading American decision on the subject of reasonable riparian use [See Cribbitt, Water as a Species of Private Property ... the Illinois View, 47 Ill. B.J. 499, 461 (1959)]. While this case concerns riparian rights (and this allocation does not) and a narrow interpretation of domestic use, it does stand for the principle that human needs for drinking water are higher than other needs.

There are no Illinois decisions which have faced conflicts between domestic users or between domestic users and industrial or manufacturing users, but it could be assumed that domestic users would prevail [See Wolff, The Need for a Reform of Water Use Law in Illinois, 53 Chicago Kent Law Review 22, 32 (1976)].

4.320 In 1931 the U.S. Supreme Court was faced with a dispute quite similar to this allocation (Connecticut v. Massachusetts, 282 U.S. 660, 75 L. Ed. 602, 51 S. Ct. 286). Boston was faced with a serious water shortage and diverted water tributary to the Connecticut River to meet its needs. This diversion did not perceptibly or materially interfere with navigation, did not affect any existing hydroelectric power use, and would not increase pollution. While other waters were available to Massachusetts, they were inferior in quality. Given these facts, the Court held that "Drinking and other domestic purposes are the highest uses of water. An ample supply of wholesome water is essential" (282 U.S. 673). This decision does not define "drinking and other domestic purposes" but it does establish their priority as long as other impacts (pollution, navigation, and power generation) are minimal.

4.330 This last case was cited by the Special Master in his Report to the U.S. Supreme Court which resulted in the 1967 decree which governed the Illinois diversion up until the recent amendments to that decree. At page 418 of his Report, Special Master Albert B. Maris stated in part as follows:

"It is well settled that the use of water for domestic purposes * is to be given first priority, as indeed it must be if human health is to be preserved and human activities are to continue."

4.340 In a footnote on page 418 of the Report, domestic use was defined as follows:

"* It is not disputed that domestic use in the setting of the present cases includes use by industrial and commercial establishments supplied with water withdrawn as domestic pumpage."

4.350 It is clear then that the priority for domestic use mandated by Section 3 of the Act is simply a codification of existing case law.

4.400

In the last proceeding, the Department granted allocations to Fort Sheridan, Glenview Naval Air Station, Great Lakes Naval Base, and the Veterans Administration Hines Hospital. Fort Sheridan did not file a formal application in this proceeding, but did appear at hearing (R. 3891-3902). In a letter filed with the Department on June 23, 1980, Fort Sheridan made it clear it was supplying water use data as a voluntary measure. Fort Sheridan felt that it was not subject to the Department's permit and regulatory procedures (File). Glenview Naval Air Station filed no request and failed to appear at hearing (R. 2268). In its most recent annual water use audit, Glenview Naval Air Station stated that it was not subject to the Department's permit and regulatory procedures (File). Great Lakes Naval Base filed an application but did not appear at hearing (R. 403). The Veterans Administration Hines Hospital filed an application and appeared at hearing (R. 1851-1886). Although the Veterans Administration never claimed it was exempt from the Department's permit and regulatory procedures, it did state that the Hines Hospital was located on a Federal reservation (R. 1855).

4.410

In his Report to the U.S. Supreme Court, Special Master Maris recommended that a decree be entered enjoining the State of Illinois and its municipalities, political subdivisions, agencies, and instrumentalities from diverting more than 3200 cubic feet of water per second from Lake Michigan. None of these Federal facilities is an Illinois municipality, political subdivision, agency or instrumentality. Section 3 of the Act states that the Department shall apportion Lake Michigan water among regional organizations, municipalities, political subdivisions, agencies or instrumentalities. Once again, no mention is made of Federal facilities which, by their own admission, cannot be regulated by the Department. In his Report, the only reference Special Master Maris made to Fort Sheridan and Great Lakes Naval Base appears at pages 417-418. He did not consider their needs because all of their sewage effluent was returned to Lake Michigan at that time. Consequently, their water needs were not included in his consideration. It would appear that the issue of whether the needs of these Federal facilities should be included in the State's permitted diversion has never been addressed. The Department concludes that the needs should never have been included. The Department will

continue to seek the voluntary cooperation of these facilities in obtaining their annual water use reports so that their uses can be deducted from future accounting reports.

- 4.500 Section 2 of the Act states that the Department shall cooperate with all levels of government, including regional organizations, in the implementation of its duties under the Act. The record in this proceeding shows that this duty was carried out. Testimony was received from the Northeastern Illinois Planning Commission (NIPC), Lake County, DuPage County Regional Planning Commission (DCRPC), Illinois Environmental Protection Agency (IEPA), Illinois Bureau of the Budget (IBOB), and the Illinois State Water Survey (ISWS). The evidence supplied by all of these agencies was very valuable. This cooperation should not be construed as any assumption that the Department relied solely on information provided by these agencies or any delegation of the Department's obligations or authority to them.
- 4.510 NIPC submitted a Regional Land Use Policy Plan and a Regional Water Supply Plan (Ex. 170). The Regional Water Supply Plan was developed in part in reliance on the Department's last allocation (R. 9534). Both of the plans are based in part on a policy which recommends stabilization and revitalization of existing communities (R. 9500). NIPC felt that allocations of Lake Michigan water should stimulate and sustain economic expansion in "mature" communities and should not be used as a vehicle to stimulate sprawl development on the suburban fringe (R. 9504). This policy also affected the population predictions which NIPC endorsed for each community in the six-county area (R. 9708). Local municipal officials also played a key role in developing these forecasts (R. 9709). The evidence supplied by NIPC was valuable for comparison with the information provided by each applicant.
- 4.520 Lake County asked the Department to establish a goal of conforming allocations with regional and county plans (R. 9202). Lake County also felt that all allocations should be based on specific maps of approved service areas (R. 9203). This approach could lead to the Department becoming a super planning agency for Northeastern Illinois. If this were to happen, the Department could be accused of allocating land in addition to Lake Michigan water. Neither result can be

justified under the Act. The Department has requested population projections and future water service area maps so that the best evidence can be gathered for each individual community. If annexations and development do not occur the way they are projected in the Order, Section 820.310 of the Rules can be employed to adjust and modify individual allocations.

4.600 There were a number of communities who were afraid that an allocation of Lake Michigan water might become an asset which could be bought and sold or bargained. In the Department's view, these fears are misplaced. Section 820.306 of the Rules states that all transfers of allocations must be approved by the Department. Consequently, transfers will not be allowed unless they are consistent with the Department's overall allocation.

4.700 Individual allocations may be used in the planning, financing, and construction of regional water systems (R. 4226, 7187, 7448, 8570). If this means that the Department's allocations will encourage construction of new regional systems, then this will be an admirable result. If circumstances change, the provisions of Section 820.310 of the Rules could be used to effect a change in any allocation. If a change in an allocation would affect an individual community's obligations on outstanding securities, debts, or contracts, Section 820.310 (c) requires the Department to examine these impacts and attempt to avoid any material adverse effects.

5.000 Chronology of Allocation

5.100 On April 1, 1980, the Secretary designated a Hearing Officer in accordance with Section 820.202 (e) of the Rules. On April 11, 1980, a notice was mailed to the six counties of Northeastern Illinois, the City of Chicago, the Metropolitan Sanitary District of Greater Chicago, all existing potential users of Lake Michigan water in those counties, interested citizens and governmental agencies. The notice stated that a prehearing conference would be held on April 28, 1980 and that hearings would begin on May 12, 1980. Notice of the two initial hearings (May 12 and May 13) was published on April 21, April 25, and May 5, 1980 in the Chicago Sun-Times, Chicago Tribune, and Southern Illinoisan newspapers. This newspaper notice and actual notice satisfied the requirements of Section 6 of the Act and Section 820.206 (a) of the Rules.

- 5.200 At the prehearing conference, procedures were discussed, copies of the emergency rules were distributed, hearing dates were selected, and the Lake Michigan Water Allocation Study and Recommendations (Ex. 5) was distributed. All parties in attendance were advised that all testimony and exhibits were to be filed seven days before the scheduled hearing for public inspection. A Prehearing Order was mailed to all parties on May 5, 1980. The Prehearing Order restated certain procedures and contained a hearing schedule. The hearing schedule was amended from time to time by the Hearing Officer. Each amendment was followed by notice to all parties as required by Section 820.211 (e) of the Rules. A water distribution system information questionnaire was mailed to all parties on July 14, 1980.
- 5.300 Allocation hearings were held on May 12, 19, 20, 21, 22, 27, 28, and 29, June 2, 3, 4, 5, 9, 11, 12, 13, 16, 17, 23, 24, 25, 26, and 30, July 1, 2, 8, 14, 21, 23, 24, 28, 29, 30, and 31, August 4, 5, 6, 7, 11, 12, 13, 14, 18, 19, 25, 26, and 28, and September 30.
- 5.400 A notice was mailed to all parties on September 10, 1980 stating that the record would close on October 15, 1980 and that all briefs should be filed by that date. On October 9, 1980, all parties were notified that briefs could be filed until November 14, 1980.
- 6.000 Chronology of Rulemaking
- 6.100 The Program and Rules and Regulations for the Allocation of Water from Lake Michigan (the Rules) were adopted pursuant to the authority in Section 9 of the Act, the notice provisions of Section 6 of the Act, and the procedures required by the Illinois Administrative Procedure Act (Ill. Rev. Stat. Ch. 127, Section 1001 et seq.).
- 6.200 The Rules were adopted on an emergency basis on April 30, 1980 and were filed with the Secretary of State that same day. The Rules were published as emergency rules (effective for 150 days) and as proposed rules in the Illinois Register on May 9, 1980.
- 6.300 Copies of proposed changes to the Rules were mailed to all parties on June 9, 1980 with notice of two rulemaking hearings (June 20 and June 27) for oral comments and with a solicitation for written comments.

The notice also stated that the Department would testify in support of the proposed changes on July 8, 1980. Notice of the two rulemaking hearings was mailed to the six counties of Northeastern Illinois, the City of Chicago, and the Metropolitan Sanitary District of Greater Chicago on June 3, 1980 and was published in the Chicago Tribune on June 6 and June 13, 1980 and in the Southern Illinoisan on June 6, 1980 as required by Section 6 of the Act.

- 6.400 On July 30, 1980, the Department provided a detailed explanation of the Rules to the Joint Committee on Administrative Rules as required by Section 7.04 of the Illinois Administrative Procedure Act. The explanation included an analysis of the economic and budgetary effects of the Rules, a copy of the Rules showing all proposed changes, an evaluation of all oral and written comments on the Rules, an analysis of the basic impact of the Rules, and a justification and rationale for the Rules. The explanation also included copies of the Act and the U.S. Supreme Court decree, showing recent proposed amendments to both, to assist the Joint Committee in its review.
- 6.500 On August 5, 1980, the Joint Committee stated a series of problems or questions concerning the Rules. These were primarily procedural, except for the comments on Section 820.305 (Emergency Allocations). The Joint Committee questioned the Department's authority in Section 820.305 (b) to grant emergency allocations before a hearing was held. On August 18, 1980, the Department responded to the Joint Committee's problems or questions with some proposed amendments to clear up ambiguities.
- 6.600 On August 22, 1980, the Department appeared before the Joint Committee to answer any remaining questions. The only issue discussed was the Department's authority to act in emergencies before a hearing was held. The Joint Committee voted to approve the Rules provided the amendments in the Department's August 18, 1980 letter were made. No amendment to Section 820.305 (b) was necessary.
- 6.700 On September 9, 1980, the Rules were adopted in their final and present form and filed with the Secretary of State. Copies of the adopted rules were mailed to all parties on September 10. The adopted rules were published in the Illinois Register on September 19, 1980.

7.000 Record

7.100 The Department's decision in this proceeding is based on a record which consists of allocation hearing transcripts, exhibits, permit files, water distribution system questionnaires, briefs and the rulemaking record. The allocation hearing transcripts cover 48 days of hearings and include 9,995 pages of testimony. There were 176 exhibits admitted into evidence. Permit files include all applications, attachments to applications, reports filed by permittees since 1977, and information requested at hearing and submitted before the close of the record. Water distribution system questionnaires contain a breakdown of the age, type, and size of each applicant's water distribution system. The rulemaking record includes two hearing transcripts (91 pages), 16 written public comments, the notice and text of proposed rules published in the May 9, 1980 Illinois Register, the notice and text of adopted rules published in the September 19, 1980 Illinois Register and the correspondence with the Joint Committee on Administrative Rules described in the Chronology of Rulemaking section of this Opinion.

8.000 The Keifer Report

8.100 Throughout the record there are numerous references to "Keifer" and the "Keifer Report." In most cases, these are abbreviations of the Lake Michigan Water Allocation Study and Recommendations (Ex. 5). The Keifer Report was prepared by the Department's consultant and included the following:

- 1) proposed determinations of residential, commercial and industrial water demands;
- 2) proposed determinations of other needs for Lake Michigan water in Northeastern Illinois;
- 3) an evaluation of the total available regional water supply resources;
- 4) estimated costs to supply Lake Michigan water to new users; and
- 5) a review of the goals and policies of the Department in other areas relevant to the allocation (R. 18).

8.200 The findings and methods used in the Keifer Report will be evaluated in other sections of the Opinion. The Keifer Report was based on regional data and Department records for the most part (R. 39, 50, 68, 104). A

series of progress reports was mailed to approximately 900 people soliciting comment on water demands and water transmission system costs (R. 285). In many cases, the Keifer Report used data supplied by individual applicants because it was more accurate (R. 98, 122).

8.300 The Keifer Report was not intended to be the last word in these proceedings. It was intended to involve the region in a long range water demand/supply planning process. Progress Report No. 4 in Appendix A of the Keifer Report stated "... the actual allocations will be based on the hearing record and may differ significantly from the consultant's recommendations". Many communities, however, used the Keifer Report proposed water demands because they had no other basis to make projections or because their own estimates approximated Keifer's.

8.400 Section 5 of the Act states that the Department must consider the water requirements of the entire Northeastern Illinois region in determining each allocation. The Keifer Report provided this overview to show that the needs of the entire region were considered. The Keifer Report provided evidence of some needs (e.g., storm runoff, and discretionary dilution) which was challenged but still stands as the primary evidence in the record to support the figures chosen by the Department. Chapter V of the Keifer Report examined a method to determine economically feasible boundary lines for supplying Lake Michigan water. In some cases this was the only evidence which could justify a classification in Category IA.

9.000 Need for the Allocation

9.100 There are two primary reasons why this allocation is necessary. First, Section 3 of the Act states that "The Department ... shall devise and develop a continuing program for the apportionment of water to be diverted from Lake Michigan ...". Second, demand exceeds supply. A review of all applications filed by May 15, 1980 showed that total requests for the year 2,000 were 4103.509 cubic feet of water per second (cfs) and 4256.542 cfs in 2020. The total allotment for Illinois is only 3200 cfs.

9.200 The high demand for Lake Michigan stems from four principal factors:

- 1) The increasing population of Northeastern Illinois has exerted an increasing demand on all of the water resources of the region.
- 2) The sustained yield of the groundwater resources in the region has already been surpassed in some areas.
- 3) Groundwater is subject to fluctuations in quality and costs for treatment.
- 4) There has been a strong preference demonstrated for Lake Michigan as a source of supply.

- 9.300 Chapter IV of the Keifer Report examined the regional water resources other than Lake Michigan. Keifer concluded that "groundwater mining" was occurring in Northeastern Illinois (Ex. 5, p. IV-5). Groundwater mining is defined as the withdrawal of water from an underground aquifer at a rate which exceeds that aquifer's natural recharge rate. When mining occurs, the water level drops (Ex. 5, p. IV-5). This drop was confirmed with evidence from the Illinois State Water Survey (ISWS) (R. 5315 - 5345, Ex. 88 and 89). ISWS showed that these declines were occurring in both the deep and shallow aquifers. Many communities supported these conclusions with their own pumping records.
- 9.400 The quality of the groundwater varies widely but there are documented levels of some parameters which exceed the standards set by the Pollution Control Board for public water supplies (Ex. 5, pp. IV-6 to IV-8, IV-20). Water treatment to comply with these standards can be quite expensive (Ex. 5, pp. IV-9 to IV-11 and IV-21; R. 9397-9402).
- 9.500 These problems with quantity and quality combine to make groundwater more costly in the future and simply less reliable.
- 9.600 The mining also deprives those communities without access to Lake Michigan water of any reliable source.
- 9.700 Extensive evidence was received on the need for home water softening or centralized community water softening throughout those communities which do not presently receive Lake Michigan water (R. 4184, 4197, 4208, 9060). This treatment would not be needed with Lake Michigan water (R. 4198, 7164, 7565).

10.000 Storm Water Runoff

10.100 Over the past 80 years, the entire flow of the Chicago and Calumet River systems has been reversed (Ex. 5, p. III-1). As a result, there is an area of 673 square miles which drains to the Illinois River and eventually into the Mississippi River instead of its historical drainage into Lake Michigan (Ex. 5, p. III-2). Section 3 of the Act and Paragraph 1 of the revised U.S. Supreme Court decree require that this diverted storm water runoff be included in the total amount Illinois is allowed to divert from Lake Michigan.

10.200 This amount of water cannot be measured directly because it is mixed with sewage effluent, directly diverted Lake Michigan water, and runoff from other drainage basins (Ex. 5, p. III-26). The amount of runoff is affected by all of the things which influence precipitation and drainage (Ex. 5, p. III-27). Keifer used a computer simulation to calculate an approximate value. The simulation was calibrated using actual measured amounts of precipitation and stream flows (Ex. 5, p. III-28). Future estimates of runoff reflect increased urbanization which will result in less percolation into the soil and consequently more runoff from the Lake Michigan watershed (Ex. 5, p. III-28).

10.300 Twenty-five years of rainfall data (1951-1975) were compared against the other variables to come up with 100 years of calculated runoff values and a 40-year moving average of these values (Ex. 5, p. III-28). The amounts listed in the Order for storm runoff reserve were determined by starting with the mean of the 40-year moving average over the next 40 years and adding in a value of 2.58 times the standard deviation. The standard deviation was derived by examining the differences between the mean and the deviation from the mean. The resulting sums should provide a confidence value of 99%, that the amount reserved for storm runoff will not be exceeded (Ex. 5, p. III-31).

11.000 Allocation Permits

11.100 Section 820.301 of the Rules requires that all users of Lake Michigan water possess a valid allocation permit. This rule also states the amount by which any user can exceed or underuse its allocation without initiation of an enforcement action or a modification proceeding.

- 11.200 Permits issued as a result of this allocation shall run from October 1 of each previous year until September 30 of the accounting year to conform with the definition of "annual accounting period" in Section 820.102 (e) of the Rules. This is the same accounting period established in paragraph 3 of the recently amended U.S. Supreme Court decree.
- 11.300 The amount by which any user can exceed its allocation (15% over a five-year period) was drawn from the Department's consultant's recommendations (Ex. 5, Appendix A, Progress Report No. 4). Keifer reviewed data from 1970 to 1979 and found that water use may vary by about 15% from average use due to fluctuations in annual rainfall and temperature. A lower figure of 5% was used to trigger a modification for underuse so that the Department can maintain a closer watch on those communities whose consumption is lower than anticipated.
- 11.400 All allocations for direct diversion are limited by a five-year running average except for lockage and leakage, which is limited by a 40-year running average. This longer period is used because these allocations were determined by examining the 40-year running average of lake levels (See discussion under the Water Demands section of this Opinion).
- 12.000 Classification
- 12.100 Section 820.303 (a) of the Rules provides for classification of all water users in categories with descending priorities among categories. The criteria for establishing priorities within categories are described in Sections 820.303 (b) and (c). Section 820.303 (d) states the rule that the Department will normally make allocations to meet the full water needs in a higher category before any Lake Michigan water is allocated to users in a lower category. Section 820.303 (e) establishes the need to reserve water for storm water runoff and future increases in demands.
- 12.110 Section 820.303 was adopted to implement the following mandates in Section 3 of the Act:
- 1) In making allocations to new users, the Department shall give priority to allocations for domestic purposes;
 - 2) The Sanitary and Ship Canal shall be maintained in

- a reasonably satisfactory sanitary condition;
- 3) The amount of water allocated for discretionary dilution shall not exceed an average of 320 cfs;
 - 4) The amount of water allocated for discretionary dilution shall not be less than 320 cfs before October 1, 2000 unless notification is received from the Illinois Environmental Protection Agency (IEPA) that pollution abatement facilities affecting the water quality of the Sanitary and Ship Canal have become operational or that standards affecting the water quality of the Sanitary and Ship Canal have been changed, in which case the Department could lower this allocation; and
 - 5) To the extent practicable, allocations to new users shall be made with the goal of reducing deep well pumpage.

- 12.120 Priorities are also needed because requested demand exceeds the available supply (See the discussion in the Need for the Allocation section of this Opinion).
- 12.130 Categories IA and IB have a higher priority because they reflect the priorities in Section 3 of the Act and paragraph 1 of the revised U.S. Supreme Court decree.
- 12.140 Economics as well as need was used as a primary criterion for designation in Category IA because economics can be measured and compared between competing applicants. Economics also offers an objective basis for determining where the limited groundwater resources should be reserved for those who need them most.
- 12.200 Category IB is higher than Category IIA because Category IB insures compliance with standards mandated by the Act and the revised U.S. Supreme Court decree.
- 12.210 Category IB requires minimum discretionary dilution flows to maintain the Sanitary and Ship Canal in a reasonably satisfactory sanitary condition. This standard is taken directly from Section 3 of the Act and paragraph 1 of the revised U.S. Supreme Court decree. The standard was recommended by Special Master Albert B. Maris in his Report to the U.S. Supreme Court which resulted in the 1967 decree. In that Report, Special Master Maris reviewed extensive data on the condition of the Sanitary and Ship Canal. The United States Public Health Service prepared a set of water quality standards which, if achieved, would make the Canal " ...

satisfactory from the standpoint of protecting the public health and eliminating nuisance conditions ..." (Report at page 180). The Public Health Service also estimated the amount of dilution with Lake Michigan water which would achieve this condition. Special Master Maris found: "The flows thus estimated as necessary to achieve satisfactory quality were, under either present or improved conditions, greater than existing dilution flows." (also at page 180) In spite of this finding, Special Master Maris concluded as follows:

"The fact is that the existing regime under which approximately 1,700 cfs of sewage effluent is diluted by approximately 1,500 cfs of storm runoff and directly diverted lake water has been adequate to maintain the waters of the canal in a reasonably tolerable sanitary state for the purposes of navigation, including its use by pleasure craft, and from the standpoint of those who work along its banks. The waters of the canal are, of course, much too polluted for recreational use, such as swimming and fishing, but such use can hardly be expected of a stream which must serve as the conduit for the disposal of the entire sewage effluent, even though treated, of so vast a population as that of the Northeastern Illinois Metropolitan Region." (Report at pages 422-423) (emphasis supplied)

- 12.220 From this reading of the Report, which supported the creation of the "reasonably satisfactory sanitary" standard, two things can be concluded. First, Special Master Maris chose not to establish any specific water quality standards for the Sanitary and Ship Canal. Second, the existing conditions in the Sanitary and Ship Canal when the Report was submitted (December 8, 1966) satisfied the standard Special Master Maris adopted.
- 12.230 Category IIA is phrased to provide the minimum discretionary dilution flows necessary to meet water quality standards in the Sanitary and Ship Canal. These standards can be found in Rule 205 (Secondary Contact and Indigenous Aquatic Life Standards) in Chapter 3: Water Pollution of the Illinois Pollution Control Board Rules and Regulations (Ex. 162). These standards are designed to assure protection to prevent toxic conditions for indigenous aquatic populations, to

prevent nuisance conditions such as septic odors and sludge banks, and to assure that downstream water quality designated for higher uses is not detrimentally impacted (R. 9374).

- 12.240 These standards are not presently being met (R. 9442).
- 12.250 Compliance with these water quality standards is placed in a priority lower than the "reasonably satisfactory sanitary" standard because the water quality standards are more stringent and are not mandated by Section 3 of the Act.
- 12.260 Since these standards are not the same as the "reasonably satisfactory sanitary" standard, they must be placed in a lower category to insure that new domestic users receive priority.
- 12.300 Category IIB includes domestic users who are presently using deep wells and did not substantiate Lake Michigan as a cost effective source of supply. These users are given equal standing with Category IIA because Section 3 of the Act states that Lake Michigan water may be used for discretionary dilution for water quality purposes and that the Department should endeavor to reduce deep well pumpage.
- 12.400 Category III exists so that there is a category for all other users who do not qualify for one of the statutory priorities.
- 12.500 In determining which users should be placed in Category IA, the Department used many criteria.
- 12.510 If an applicant was already using Lake Michigan as its sole source of supply, classification in Category IA was automatic. These users have no other source of supply, and it would be obviously uneconomical to require them to develop one. The following users fit this description:

Alsip
Bannockburn
Bedford Park
Berkeley
Berwyn
Blue Island

Bridgeview
Broadview
Brookfield
Burnham
Calumet City
Calumet Park

Central Stickney San. Dist.	Maywood
Chicago	McCook
Chicago Ridge	Melrose Park
Cicero	Merrionette Park
Countryside	Midlothian
Crestwood	Morton Grove
Deerfield	Niles
Delmar Woods	Norridge
Dixmoor	Northbrook
Dolton	North Chicago
East Hazel Crest	Northfield
Elmhurst Park	Northlake
Evanston	North Riverside
Evergreen Park	Oak Forest
Forest Park	Oak Lawn
Forest View	Oak Park
Franklin Park	Palos Heights
Garden Homes San. Dist.	Palos Hills
Glenbrook Countryside Manor	Park Ridge
Glencoe	Phoenix
Glenview	Posen
Golf	Republic Steel
Harvey	Riverdale
Harwood Heights	River Forest
Hazel Crest	River Grove
Highland Park	Robbins
Highwood	Rosemont
Hillside	Schiller Park
Hodgkins	Skokie
Hometown	South Holland
Illinois State Beach Park	South Stickney San. Dist.
Interlake	Stickney
Justice	Stone Park
Kenilworth	Summit
Knollwood-Rondout	Tinley Park
LaGrange Park	U.S. Steel (South Works)
Lake Bluff	Waukegan
Lake County Pub. Water Dist.	Westchester
Lake Forest	Willow Springs
Lansing	Wilmette
Leyden Township	Winnetka
Lincolnwood	Wisconsin Steel
Loyola University Med. Ctr.	Worth
Madden Mental Health Ctr.	Zion
Markham	

12.520 Applicants who were already using Lake Michigan for part of their supply and requested a 100% allocation were placed in Category IA and granted full allocations. Some of these users are already commingling water from a surface water source (Lake Michigan) and groundwater sources (shallow and/or deep wells). The Department does not feel that this practice should be required. Two of the communities presently commingling Lake Michigan water with groundwater reported corrosion in their distribution systems, but they did not know whether commingling was the cause (R. 721, 832). Two other systems presently commingling reported no corrosion problems (R. 1579, 4030). The Northwest Suburban Water System (Venture) concluded that commingling may have adverse effects on distribution systems (Ex. 122). The DuPage Water Commission felt that commingling could cause corrosion (R. 4229). Keifer concluded that commingling could lead to higher unit costs for water (Ex. 5, p. IV-29). The following users were placed in Category IA because they are presently commingling:

Des Plaines
Hickory Hills
Libertyville

Lyons
Riverside
Winthrop Harbor

12.530 Chapter V of the Keifer Report (Ex. 5) contained a proposed method to determine which communities not presently using Lake Michigan water could be served more economically with Lake Michigan water. The method also examined expanded Lake Michigan use by some communities with separate well systems. The method used costs for treatment and operation of groundwater systems and related costs for transmission and delivery of treated Lake Michigan water. Many of these cost estimates were challenged; but, in general, they provide a workable approach for determining which communities can be more economically served with Lake Michigan water.

12.540 Using the method described in Chapter V of the Keifer Report, the following communities can be classified in Category IA because they could be served by nearby Lake Michigan using neighbors for less than \$1.20/1000 gallons:

Lynwood
Orland Park
Riverwoods

Sauk Village
Thornton

12.550 Chapter V of the Keifer Report showed an estimated cost to supply Lake Michigan water to Lincolnshire and Long Grove in excess of \$2.00/1000 gallons. While this cost is somewhat high, Lincolnshire provided its own estimate at less than \$1.00/1000 gallons to serve itself and Long Grove (R. 5067). Consequently these two communities have also been placed in Category IA.

12.560 The method in Chapter V of the Keifer Report can be used to classify the following communities in Category IA as future customers of the Justice-Willow Springs Water Commission for less than \$1.20/1000 gallons:

Indian Head Park	LaGrange Highlands San. Dist.
LaGrange	Western Springs

12.570 The following communities described present supply problems and established their own plans for connection with nearby Lake Michigan sources which have available capacity to serve them. Consequently, these communities can also be classified in Category IA:

Citizens Utilities Fernway Service Area (R. 8179)	
Gurnee (R. 1645)	Park City (R. 2876)
Palos Park (R. 5941)	South Palos Twp. San. Dist. (R. 9557)
	Beach Park San. Dist. (R. 8840)

12.580 Chapter V of the Keifer Report also hypothesized some alternative regional transmission systems which could provide Lake Michigan water more economically than present local groundwater. The following communities can be classified in Category IA because they were included in one of these alternative proposed systems and because enough other communities were willing to cooperate in construction of one of these projects to make them feasible at a cost less than \$2.00/1000 gallons:

Addison	Citizens Utilities
Arlington Heights	Chicago Suburban
Bensenville	Lombard Heights
Bloomington	Waycinden
Buffalo Grove	Clarendon Hills
Burr Ridge	Country Club Hills
Carol Stream	Darien
Chicago Heights	Downers Grove

Elk Grove Village	Oak Brook Terrace
Elmhurst	Olympia Fields
Ferndale Heights	Palatine
Flossmoor	Prospect Heights
Glendale Heights	Richton Park
Glen Ellyn	Rolling Meadows
Glenwood	Roselle
Grayslake	Round Lake Beach
Hanover Park	Round Lake Park
Hinsdale	Schaumburg
Hoffman Estates	Streamwood
Homewood	Villa Park
Itasca	Westmont
Lisle	Wheaton
Lombard	Wheeling
Matteson	Wildwood-Gages Lake
Mount Prospect	Willowbrook
Mundelein	Wood Dale
Naperville	Woodridge
Oak Brook	

12.590 The following communities were not included in any of the proposed alternatives in Chapter V of the Keifer Report. They have been included in Category IA because of their close proximity to one of the feasible alternatives, their willingness to participate in construction and funding, and the demonstrated problems with their existing groundwater sources:

Citizens Utilities Service Areas
 Country Club Highlands (R. 8068, 8069, 8078)
 Valley View (R. 8105, 8106, 8117)
 Arrowhead (R. 8124, 8125, 8131)
 Du Page County Department of Public Works (R. 8285, 8307, 8344, 8350, 8355, 8358, 8360)
 Hinswood
 Lake-in-the-woods
 Farmingdale Village
 Rosewood Trace
 Steeple Run
 Glen Ellyn Heights
 Warrenville (R. 8917)
 Vernon Hills (R. 6488, 6506)

12.600 Criteria for classification in Categories IB and IIA were not necessary because the Metropolitan Sanitary District of Greater Chicago was the only user eligible for these two categories.

12.710 Chapter V of the Keifer Report had a proposed alternative to supply Lake Michigan water to seven Fox River communities at a cost in excess of \$2.00/1000 gallons. Four of these communities requested allocations but did not present any independent cost estimates. These cost estimates are too high to justify inclusion in Category IA. Since all four of these communities rely on deep wells, they have been included in Category IIB:

Aurora	North Aurora
Montgomery	West Chicago

12.720 Two users were classified in Category IIB because they were domestic users and were relying on deep wells but did not have any documented method for obtaining Lake Michigan water. These communities are:

Bartlett (R. 8997, 8967)
Lemont (R. 9604, 9616)

12.800 The five remaining domestic users were classified in Category III because they did not meet the criteria for Category IA or Category IIB. They are as follows:

Bolingbrook	Citizens Utilities
Crete	West Suburban/Santa Fe
Steger	Arbury

12.810 Bolingbrook stated it does not presently need Lake Michigan water (R. 6012) and it was not included in any of the alternative systems in the Keifer Report. Bolingbrook does not use any deep wells (App.).

12.820 Crete was included in one of the proposed alternatives in Chapter V of the Keifer Report, but since South Chicago Heights did not request an allocation, this alternative does not appear feasible. Crete does not use deep wells (App.).

12.830 Steger was included in one of the proposed alternatives in Chapter V of the Keifer Report, but since South Chicago Heights did not request an allocation, this alternative does not appear feasible (R. 6968). Steger does not use deep wells (App.).

12.840 The Citizens Utilities West Suburban/Santa Fe service area was not included in any of the proposed

alternatives in Chapter V of the Keifer Report. No independent cost estimates were given (R. 8136, 8138, 8140). There are no deep wells in this service area (R. 8145).

- 12.850 The Citizens Utilities Arbury service area was not included in any of the proposed alternatives in Chapter V of the Keifer Report. No independent cost estimates were given (R. 8205, File). There are no deep wells in this service area (R. 8199).

13.000 Conservation

- 13.100 Section 5 of the Act states, in part, as follows:

"The Department shall require that all feasible means reasonably available to the State and its municipalities, political subdivisions, agencies and instrumentalities shall be employed to conserve and manage the water resources of the region and the use of water therein in accordance with the best modern scientific knowledge and engineering practice."

- 13.110 This mandate is repeated in Paragraph 4 of the revised U.S. Supreme Court decree as a condition which must be met before the State can request a future modification of this decree.

- 13.120 Section 820.307 of the Rules is the Department's response to this requirement. This section lists a number of conservation practices designed to eliminate wasteful water use. Some of these practices were required in the last allocation and the rules which accompanied that proceeding.

- 13.200 Section 820.307 (b) requires all domestic users of Lake Michigan water to reduce unaccounted-for flows to 12% by 1981 and 8% by 1986. Unaccounted-for flow is defined in Section 820.102 (i) of the Rules as the water supplied to a water system which is lost prior to delivery to an end user. Unaccounted-for flow does not include unavoidable leakage which is the water lost at pipe joints, service connections, valves and hydrants. The maximum amount of water which can be lost through unavoidable leakage is set by a formula in Section 820.102 (h) of the Rules. The formula is based on the length and age of each water system and the types of pipes and joints used in each system.

- 13.210 The Department feels that underground leakage and unaccounted-for flow must be controlled to provide the maximum amount of the State's limited Lake Michigan water for its intended uses (R. 5243). Limiting these flows also makes good economic sense because all the water in a system must be produced or purchased. The water which is lost through leakage or poor accounting represents lost revenue from consumers or increased water rates (R. 5252). The Department presented sample calculations to show that expenses for improved system accounting would pay for themselves (R. 5253-5254). The formula for the maximum allowable unavoidable leakage was based on a review of the literature in this field recognizing that leakage will increase as a system ages (R. 5359-5262).
- 13.220 An allowance of 8% unaccounted-for flow, in addition to unavoidable leakage, should provide for flexibility in water system operation and allow for some underregistration in customers' water meters and losses from main breaks (R. 5264). The starting point of 12% unaccounted-for flow in 1981 comes from the Department's last allocation which required unaccounted-for flows no greater than 12% in 1980 (Paragraph 4 D 1 of the Order). This 12% figure included all unmetered uses. A national study found a mean rate of 11 or 12% unaccounted-for flows in 1971 (R. 5258, Ex. 5, p. II-26).
- 13.230 Section 820.307 (e) of the Rules states that hydrant uses must be limited to 1% of net annual pumpage by 1981. Barring some unusual circumstances established through engineering studies of an individual system, the Department believes that this allowance is reasonable (R. 5257). Hydrant uses are defined in Section 820.102 (j) of the Rules as water taken from hydrants excluding metered water used for public and private construction.
- 13.240 Calculations for determining unaccounted-for flow are based on net annual pumpage. Net annual pumpage is defined in Section 820.102 (1) of the Rules as the total amount of water delivered to a system excluding wholesale water delivered to other systems. The Department chose to use net annual pumpage instead of gross annual pumpage to achieve consistency in the Rules and avoid inequitable results. The formula for unavoidable leakage recognizes that losses are contingent on system size and age. It would be inconsistent to allow a community to use its gross pumpage figures to compute unaccounted-for flow (R.

5267). Calculations of unaccounted-for flow based on gross pumpage would allow permissible losses to be aggregated for each system through which water is passed (R. 5268). This would defeat the purpose of the water conservation standards, i.e. making more Lake Michigan available for domestic use (R. 5269).

- 13.250 After computing maximum unavoidable leakage for each of the 182 communities with public water supplies receiving an allocation, allowing no more than 1% of net annual pumpage for hydrant uses, and calculating unaccounted-for flow; the following results were obtained based on 1979 accounting:

<u>% unaccounted- for flow</u>	<u>number of communities</u>	<u>% of total</u>
0	22	12
8.0 or less	92	51
12.0 or less	119	65
12.0 or greater	63	35

- 13.260 The average unaccounted-for flow for the 182 communities was 10.4%.

- 13.300 Additional water conservation requirements are stated in Section 820.307 (c) of the Rules. Section 820.307 (c) (1) requires leakage monitoring and correction for storage, transmission and distribution systems. Sections 820.307 (c) (2) and (3) require that all new construction and existing construction which undergoes major remodeling be metered.

- 13.310 In the Report to the U.S. Supreme Court which resulted in the 1967 decree, Special Master Maris described some of the conservation measures which he believed were feasible. At page 429 of the Report he concluded in part as follows:

"It is sufficient now to say that some at least of these expedients are entirely feasible from every standpoint and should be employed in any program for the enlightened management and use of water resources. In this category would certainly fall the best procedures available for the detection and repair of leaking mains and customer service lines and fixtures, the universal metering of customer services, ..." (R. 5246).

- 13.311 Ongoing leak detection and control programs were also recommended by NIPC in 1978 (R. 5249).
- 13.400 Sections 820.307 (c) (1), (6), and (7) of the Rules require the installation of water efficient plumbing fixtures in new construction and in the repair and/or replacement of existing fixtures.
- 13.410 These practices were all found to be presently feasible on page 57 of the Department's Opinion in the last allocation.
- 13.420 For the most part, all of the communities granted allocations in the last proceeding have adopted ordinances requiring these practices.
- 13.430 Section 820.307 (c) (5) requires the installation of closed system air conditioning in all new construction and in all remodeling. This practice is a form of recycling which is mentioned by Keifer as a method which can result in considerable savings in water use (Ex. 5, p. II-27).
- 13.440 Keifer estimated that total water use could be reduced by 4-5% through the installation of water efficient plumbing fixtures in built-up areas and by 11% in areas of new development (Ex. 5, p. II-26). The Northwest Suburban Water System (Venture) estimated that some of its member communities had saved 10-20% by these and other conservation practices with a projected savings of 5-15% (Ex. 122).
- 13.500 Section 820.307 (c) (8) requires each permittee to develop public programs to encourage reduced water use. Many communities described their efforts to remind consumers of water saving tips and to educate school children in this regard.
- 13.600 Section 820.307 (c) (9) requires minimal use and accurate reporting for Lake Michigan water used for purposes associated with direct diversion. While this rule does not state any specific practices which must be followed, it is generally related to the mandate in Section 5 of the Act which states that all feasible means must be employed to conserve and manage the water resources of the region. This rule also implements the requirement of Section 3 of the Act which requires a priority in allocations for domestic use.

- 13.700 Section 820.307 (d) requires all permittees using deep wells to submit a phased program to end this practice. This rule is consistent with Section 3 of the Act which states, in part, as follows:
- " ... the Department shall ... to the extent practicable make any allocations to new users of Lake Michigan water with the goal of reducing withdrawals from the Cambrian-Ordovician aquifer."
- 13.710 This rule also helps insure that those communities without access to Lake Michigan water have a continued groundwater supply (see the discussion in the Need for the Allocation section of this Opinion).
- 13.720 These phased programs will have to be reviewed by the Department on a case by case basis, but some guidelines can be stated here. Most wells must be taken out of service once every four or five years for rehabilitation. Consequently, the Department anticipates that deep well pumpage will be eliminated a maximum of five years after Lake Michigan water is received.
- 13.730 Some communities stated that they intended to retain their deep wells for use on an emergency or standby basis. This practice will not be prohibited as long as it is understood that deep wells will only be used in an actual emergency such as a failure of Lake Michigan supply and will not be used to supply peak flows during normal periods of high demand.
- 13.740 The allocations which the Department has granted are based on the anticipated average daily demands in these communities. Consequently, the allocations provide for peak flows.
- 13.800 Section 820.307 (f) recommends the adoption of water rate structures based on metered water use designed to discourage excessive water use.
- 13.810 At page 148 of this Report to the U.S. Supreme Court, Special Master Maris stated in part as follows:
- "Universal metering reduces customer waste and fixture leakage, but it does not produce any permanent reduction in legitimate water consumption."

14.000 Water Demands

14.100 General

14.110 The criteria the Department has used for establishing individual water needs for each applicant are stated in Section 820.304 of the Rules. This rule states a number of factors (population, growth, per capita consumption, industrial and municipal uses, and conservation practices) which the Department can examine. These factors are patterned after Section 5 of the Act which states in part as follows:

"The Department shall be guided by population, business and economic projections and requirements. The Department shall require that all feasible means ... shall be employed to conserve and manage the water resources of the region and the use of water therein in accordance with the best modern scientific knowledge and engineering practice."

14.120 With the exception of restating the Department's standards for permissible unaccounted-for flow in Section 820.307 (b), this rule does not state any specific formula or method which the Department must use for each applicant. In an administrative review of the Department's last allocation, the Illinois Supreme Court commented as follows:

"It is a fair reading of section 5 taken as a whole, however, that in making its apportionment the Department is to consider the water requirements of each applicant, and is to do so in the light of its population, both present and projected, of the alternative sources of water available to it, and of its practices in conserving its use of water. We do not believe that, under the unusual circumstances giving rise to this legislation, the General Assembly was required to specify the amount of water to be awarded each applicant or provide a rigid formula from which that amount could be calculated, nor yet to attempt a ranking of priorities among the many different factors which necessarily enter into the allocation process. While we recognize that there is no onus upon the appellants to draft a model apportionment act, we nevertheless find it significant that none of them is prepared to specify what form of statute

would meet their criticism and also deal with the problem of apportionment in a workable manner."
[Village of Riverwoods, et al. v. Department of Transportation, et al., 77 Ill. 2d 130, 395 N.E. 2d 555 (1979)]

14.200 Domestic Use

14.210 The Department's consultant prepared a list of projected water demands for all but a few of the applicants in this proceeding.

14.211 Keifer used population forecasts for the years 2000 and 2010 prepared by NIPC in 1976 and adjusted them downward to conform with the 1977 regional projection from IBOB (Ex. 5, p. II-3, R. 39). The 1980 population forecasts were estimated by extrapolating post-1970 trends in changes in population and household size (Ex. 5, pp. II-4,5). The projections of population for the years 2010 to 2020 were based on a continuation of the growth rates predicted from 2000 to 2010. The projected populations from 1980 to 2020 are contained in Table II-1 of Exhibit 5. Forecasts for manufacturing employment in each municipality were taken from NIPC forecasts prepared in 1976 (Ex. 5, p. II-17). Future water demands were calculated by Keifer with a formula which included existing water use from each community and projected population and manufacturing employment (Ex. 5, p. II-17). Existing water use information was drawn from the Department's records for 1974, 1977, and 1978, or from the ISWS (R. 66, Ex. 5, p. II-19). Projected water use was adjusted to allow no more than 12% unmetered or estimated water use based on 1978 data (Ex. 5, p. II-21, R. 88, 218, 224).

14.212 These forecasts were mailed to each community in October, 1979 (Ex. 5, Appendix A). Responses from some of the communities resulted in a revised set of forecasts mailed in January, 1980 (Ex. 5, Appendix A, Progress Report No. 3). Final adjustments were made in March, 1980 (Ex. 5, Appendix A, Progress Report No. 4).

14.213 Keifer estimated the margin of error in his calculations at plus or minus 15% (R. 71).

14.214 Keifer indicated that information on land use patterns and commercial activity from each community could be better indicators of future water use than his method, but that he did not have this sort of detailed

information (R. 75). Keifer felt that these local predictions could be more accurate as long as they were consistent with regional projections (R. 85).

- 14.220 All of Keifer's projected water demands were calculated before the hearings in the allocation were begun. Some of the communities included in Keifer's analysis never requested allocations. Other communities which were never mentioned in the Progress Reports appeared before the Department and requested allocations. All of the communities which appeared provided water use data for 1979 which was not available to Keifer. NIPC and IBOB provided revised population and employment projections. The Department revised its regulations on unaccounted-for flow. Many of the applicants revised their requested allocations along the way and corrected or explained a significant portion of their historic water use data.
- 14.230 The Department has reviewed all of the current data and projections to arrive at revised water demand calculations. These revised calculations were compared with each community's request to see which requests required a closer examination.
- 14.240 The data and methods used in the Department's calculations will be presented here.
- 14.241 NIPC presented a list showing population and number of households in 1980 and 2000 for each municipality in Northeastern Illinois (Ex. 172). NIPC's figures were designed to maintain a plus or minus 10% relationship with IBOB forecasts (R. 9707). Many of NIPC's figures were adjusted after comment was received from 167 different municipalities (R. 9709). NIPC used demographic trends to predict changes in household size over the next 20 years and resulting population (R. 9712-9715). NIPC discussed these figures with each responding municipality because it was not able to prepare its own final estimates for each community (R. 9754).
- 14.242 IBOB presented estimates of employment by industrial categories for each county in Northeastern Illinois from 1975 to 2000 and estimates of population for each county from 1970 to 2025 (Ex. 174). IBOB's projections were based on a step-down procedure starting with Illinois as a whole, then broken down by regions, then by counties (R. 9861). All projections were based on the Cohort

Survival method in which births, deaths, and net migration were projected separately (R. 9869). The population figure calculated from births and deaths was modified by a net migration factor based on the balance between labor force supply and labor force demand (R. 9870).

- 14.243 The Department used the population figures supplied by NIPC for each community for the years 1980 and 2000 or made independent calculations for unincorporated areas. Population estimates for 1990 were interpolated between 1980 and 2000 and held consistent with the county projections supplied by IBOB for 1990. Population estimates for 1985 were assumed to be the midpoint between 1980 and 1990. Population estimates for 2010 were based on each community maintaining its share of its county's population as projected by IBOB. This process was repeated for estimated 2020 population. Whenever a portion of a community's existing or projected boundaries included an area served by a separate water utility, these areas and their populations were separated or "carved out" of future estimates. Household size figures were calculated from NIPC estimates for 1980 and 2000 with the necessary interpolations. Household size for 2010 and 2020 was assumed equal to the 2000 household size.
- 14.244 The manufacturing employment figures prepared by NIPC in 1976 were adjusted on the basis of the 1980 estimates from IBOB. Each community's share of its county's employment was projected to remain constant in relation with the IBOB employment forecasts through 2000. Employment figures beyond 2000 were based on each community's projected share of its county's population in 2010 and 2020.
- 14.245 Each community provided the Department with data on the age and length of its distribution system. The Department used this data to calculate the present amount of allowable unavoidable leakage according to the formula in Section 820.102 (h) of the Rules. The amount of unavoidable leakage was projected to increase over the next 40 years due to the increased age of each system. If a community showed that additional land was available for growth, calculations of increased system length were also performed. Increased system length was based on the present relationship between the number of households and length of the system and the projected number of households.

14.246 Each community's unaccounted-for flow was calculated for 1979 in accordance with the definition of unaccounted-for flow in Section 820.102 (i) of the Rules. The following list shows the values for unaccounted-for flow (in percent of net annual pumpage) in 1979 for each community and the method used for calculating future allowances for unavoidable leakage (A = increased age only, A-G = increasing age and system length):

Addison	A-G	11.7
Alsip	A-G	1.8
Arlington Heights	A-G	9.1
Aurora	A-G	10.0
Bannockburn	A-G	3.0
Bartlett	A-G	6.0
Bedford Park	A	0.0
Bensenville	A-G	13.9
Berkeley	A-G	7.1
Berwyn	A	45.3
Bloomington	A-G	8.0
Blue Island	A	30.0
Bridgeview	A	15.0
Broadview	A	14.8
Brookfield	A	6.75
Buffalo Grove	A-G	0.0
Burnham	A-G	6.0
Burr Ridge	A-G	0.0
Calumet City	A	6.0
Calumet Park	A	27.0
Carol Stream	A-G	7.2
Central Stickney San. Dist.	A	0.7
Chicago	A	14.6*
Chicago Heights	A-G	20.0
Chicago Ridge	A	11.8
Cicero	A	38.2
Citizens Utilities		
(Arrowhead)	A-G	6.5
(Lombard)	A	9.5
(Valley View)	A-G	20.2
(Waycinden)	A-G	15.4
(Fernway)	A-G	31.2
(Country Club Highlands)	A	10.1
(Chicago Suburban)	A-G	19.7
Clarendon Hills	A-G	9.0
Country Club Hills	A-G	0.0
Countryside	A	22.7
Crestwood	A-G	2.9
Darien	A-G	0.0

Deerfield	A-G	1.0
Delmar Woods	A	20.0
Des Plaines	A	16.6
Dixmoor	A	37.3
Dolton	A	2.0
Domestic Utilities	A-G	2.1
Downers Grove	A-G	8.9
DuPage Co. Public Works		
(Hinswood)	A	37.0
(Lake-in-the-woods)	A	10.0
(Farmingdale Village)	A	19.0
(Rosewood Trace	A	20.0
(Steeple Run)	A	16.0
(Glen Ellyn Heights)	A	22.0
East Hazel Crest	A	0.0
Elk Grove Village	A-G	5.5
Elmhurst	A	8.0
Elmwood Park	A	21.6
Evanston	A	6.2
Evergreen Park	A	3.4
Ferndale Heights	A-G	1.0
Flossmoor	A-G	17.4
Forest Park	A	14.7
Forest View	A	0.0
Franklin Park	A	7.0
Garden Homes San. Dist.	A	0.0
Glenbrook Countryside Manor	A	0.0
Glencoe	A	17.0
Glendale Heights	A-G	3.0
Glen Ellyn	A-G	22.0
Glenview	A-G	12.1
Glenwood	A-G	6.0
Golf	A	26.0
Grayslake	A	0.0
Gurnee	A-G	2.0
Hanover Park	A-G	6.0
Harvey	A	7.9
Harwood Heights	A	10.6
Hazel Crest	A-G	2.7
Hickory Hills	A-G	14.9
Highland Park	A-G	12.0
Highwood	A	4.9
Hillside	A	17.0
Hinsdale	A	11.6
Hodgkins	A	13.3
Hoffman Estates	A-G	9.9
Hometown	A	3.0
Homewood	A-G	16.0
Indian Head Park	A-G	0.0

Itasca	A-G	1.0
Justice	A-G	4.0
Kenilworth	A	17.0
Knollwood-Rondout	A-G	0.0
LaGrange	A	0.0
LaGrange Highlands San. Dist.	A	3.0
LaGrange Park	A	15.4
Lake Bluff	A-G	13.8
Lake County Pub. Water Dist.	A-G	12.3
Lake Forest	A-G	6.0
Lansing	A-G	0.0
Lemont	A-G	47.0
Leyden Twp.	A	8.9
Libertyville	A-G	12.8
Lincolnshire	A-G	8.0
Lincolnwood	A	0.6
Lisle	A-G	4.0
Lombard	A-G	11.9
Lynwood	A-G	13.0
Lyons	A	35.0
Markham	A-G	10.6
Matteson	A-G	0.0
Maywood	A	31.0
McCook	A	5.7
Melrose Park	A	21.8
Merrionette Park	A	0.0
Midlothian	A	0.4
Montgomery	A-G	27.0
Morton Grove	A	14.7
Mount Prospect	A-G	3.9
Mundelein	A-G	2.0
Naperville	A-G	9.0
Niles	A	6.2
Norridge	A	25.5
North Aurora	A-G	11.0
Northbrook	A-G	5.3
North Chicago	A-G	3.8
Northfield	A-G	3.7
Northlake	A-G	2.7
North Riverside	A	11.4
Oak Brook	A-G	17.6
Oak Forest	A-G	6.0
Oak Lawn	A-G	4.9
Oak Park	A	11.0
Olympia Fields	A-G	2.0
Orland Park	A-G	3.0
Palatine	A-G	14.8
Palos Heights	A-G	4.4
Palos Hills	A	2.3

Park City	A-G	10.3
Park Ridge	A	16.6
Phoenix	A	16.9
Posen	A-G	1.5
Richton Park	A-G	6.5
Riverdale	A	0.2
River Forest	A	6.4
River Grove	A	27.0
Riverside	A	0.0
Riverwoods	A-G	4.0
Robbins	A-G	19.1*
Rolling Meadows	A-G	9.6
Roselle	A-G	3.0
Rosemont	A	4.0
Round Lake Beach	A-G	7.6
Sauk Village	A-G	10.2
Schaumburg	A-G	7.5
Schiller Park	A-G	12.8
Skokie	A	13.4
South Holland	A-G	4.3
South Stickney San. Dist.	A	3.6
Stickney	A	0.0
Stone Park	A	14.9
Streamwood	A-G	14.3
Summit	A	18.3
Thornton	A	10.3
Tinley Park	A-G	4.8
Vernon Hills	A-G	15.8
Villa Park	A	5.2
Warrenville	A-G	24.0
Waukegan	A-G	3.3
Westchester	A-G	23.9
West Chicago	A-G	9.0
Western Springs	A	10.3
Westmont	A-G	17.6
Wheaton	A-G	8.0
Wheeling	A-G	3.0*
Wildwood-Gages Lake	A-G	0.0
Willowbrook	A-G	0.0
Willow Springs	A-G	3.0
Wilmette	A	19.6
Winnetka	A	12.8
Winthrop Harbor	A-G	2.6
Wood Dale	A-G	10.9
Woodridge	A-G	10.0
Worth	A	7.8
Zion	A-G	3.8

* Unaccounted-for flows for these communities based on estimates of non-metered uses.

14.247 Water demands for each community were calculated using an equation similar to the one used by Keifer with a significant change to include the application of the Department's rules on unavoidable leakage and unaccounted-for flow. As unavoidable leakage increases based on system length and age, this increment was added into future demands. The water demands for all communities with unaccounted-for flows in excess of 12.0% were reduced to comply with the following schedule:

1981	12%
1982	12%
1983	11%
1984	10%
1985	9%
1986	8%

The water demand for all communities with 1979 unaccounted-for flows between 8% and 12% were reduced initially in those years in this schedule in which their present unaccounted-for flows exceeded the values in the schedule.

14.250 The Department compared its own calculated water demands with the requested Lake Michigan allocations for each applicant in Categories IA and IIB.

14.251 The following communities' requests were lower than the Department's calculations so the communities' requests were used:

Arlington Heights
Citizens Utilities Lombard Service Area
Crestwood
Domestic Utilities
DuPage County Public Works Hinswood and Steeple Run
Service Areas
Garden Homes San. Dist.
Golf
Hickory Hills
Highland Park
Hillside
Itasca
Justice
LaGrange Highlands San. Dist.

Lake County Pub. Water Dist.
 Naperville
 Northbrook
 Oak Forest
 River Forest
 Round Lake Beach
 Stickney
 Thornton
 Warrenville
 Wood Dale
 Worth

- 14.252 The following applicants are primarily industrial users, and the Department's calculations were deemed inappropriate. Consequently, the applicants' requests were used.

Bedford Park
 Interlake, Inc.
 Republic Steel Corporation
 U.S. Steel Corporation (South Works)
 Wisconsin Steel

- 14.253 The following communities' requested allocations were slightly higher than the Department's calculations, but the differences were slight. Consequently, the communities' requests were used.

Clarendon Hills	Lisle
Deerfield	Montgomery
Elk Grove Village	Oak Lawn
Evanston	Palos Heights
Forest View	Palos Hills
Glenbrook Countryside Manor	Sauk Village
Glencoe	Waukegan
Harvey	Western Springs
Indian Head Park	Winnetka

- 14.254 The following communities projected service in areas which presently have no public water supply. Consequently, the Department's calculations were inappropriate and the applicants' requests were used.

Bannockburn	Knollwood-Rondout
Beach Park San. Dist.	Riverwoods
Burr Ridge	Round Lake Park
Illinois Beach State Park	South Palos Twp. San. Dist.

- 14.254.1 Due to its high percentage of commercial use, the Department's calculations for Rosemont were not appropriate. Consequently, Rosemont's request was used.
- 14.244.2 The Department had no method to project the water demands for the Madden Mental Health Center. Consequently, their request was used.
- 14.254.3 The Department has used the requests from Aurora and Mundelein because they appear to be adequate to serve these communities calculated water demands with no deep well pumpage.
- 14.254.4 Loyola University Medical Center substantiated its growth from 1981 to 1990, but the growth appeared rather speculative after 1990. Consequently, the applicant's request was used until 1990 and held constant after 1990.
- 14.255 The following communities requested less than the Department's calculations during the initial years and then more based on growth which was not substantiated and was inconsistent with regional projections. The Department used these communities' requests until they exceeded the Department's calculations and then used the Department's own calculations.
- | | |
|----------------------------|-----------------------------|
| Bridgeview (until 2000) | Matteson (until 2000) |
| Buffalo Grove (until 2000) | North Aurora (until 1990) |
| Glenwood (until 2000) | Northfield (until 1990) |
| Grayslake (until 2010) | Palos Park (until 1987) |
| Hazel Crest (until 1990) | Tinley Park (until 1990) |
| Hodgkins (until 1984) | West Chicago (until 2000) |
| Long Grove (until 1990) | Wheeling (until 2000) |
| Lynwood (until 1983) | Willow Springs (until 1982) |
| Markham (until 1985) | Zion (until 1990) |
- 14.255.1 The following communities requested an allocation greater than the Department's calculations in the initial years and less in the later years. The Department's calculations in the initial years were used because they account for reductions from excessive unaccounted-for flow.
- | |
|-------------------------|
| Glenview (until 1985) |
| Kenilworth (until 1990) |
- 14.255.2 The following communities' requests were greater than the Department's calculations primarily due to reductions for excessive unaccounted-for flow. The

Department's calculations were used to provide for this reduction.

Bensenville
Berwyn
Calumet Park
Cicero
Citizens Utilities Valley View Service Area
Citizens Utilities Fernway Service Area
Citizens Utilities Chicago Suburban Service Area
Countryside
Delmar-Woods
Des Plaines
Dixmoor
Elmwood Park
Forest Park
Glen Ellyn
LaGrange Park
Libertyville
Lyons
Morton Grove
Oak Park
Phoenix
River Grove
Stone Park

- 14.255.3 The following communities' requests were higher than the Department's calculations because of high unaccounted-for flows and unsubstantiated population projections which were inconsistent with regional projections. The Department's calculations were used to account for these differences.

Blue Island	Melrose Park
Broadview	Norridge
Chicago Heights	Oak Brook
DuPage County Public Works	Palatine
Lake-in-the-Woods	Park Ridge
Farmingdale Village	Robbins
Rosewood Trace	Skokie
Glen Ellyn Heights	Vernon Hills
Lemont	Westchester
Maywood	Wilmette

- 14.255.4 The following communities' requests were higher than the Department's calculations based on unsubstantiated population projections inconsistent with regional projections. The Department's calculations were used to account for this difference.

Addison
Alsip
Bartlett
Berkeley
Bloomingdale
Brookfield
Burnham
Calumet City
Carol Stream
Central Stickney Sanitary District
Chicago Ridge
Citizens Utilities Arrowhead Service Area
Citizens Utilities Waycinden Service Area
Citizens Utilities Country Club Highlands
Service Area
Country Club Hills
Darien
Dolton
Downers Grove
East Hazel Crest
Elmhurst
Evergreen Park
Ferndale Heights
Flossmoor
Franklin Park
Glendale Heights
Gurnee
Hanover Park
Harwood Heights
Highwood
Hinsdale
Hoffman Estates
Hometown
Homewood
LaGrange
Lake Bluff
Lake Forest
Lansing
Leyden Township Service Area
Lincolnshire
Lincolnwood
Lombard
McCook
Merrionette Park
Midlothian
Niles
North Chicago
Northlake
North Riverside

Olympia Fields
 Orland Park
 Park City
 Posen
 Richton Park
 Riverdale
 Riverside
 Rolling Meadows
 Roselle
 Schaumburg
 Schiller Park
 South Holland
 South Stickney San. Dist.
 Streamwood
 Summit
 Villa Park
 Wheaton
 Wildwood-Gages Lake
 Willowbrook
 Winthrop Harbor
 Woodridge

- 14.256 The Department's calculations for Mount Prospect and Westmont show initial needs greater than the communities' requests due to the elimination of deep well pumpage and then lower needs to account for populations lower than both communities' projections and a reduction for excessive unaccounted-for flow in Westmont. The Department's calculations were used to account for these differences.
- 14.257 Chicago's water demand was assumed to remain constant at 830 MGD for the next 40 years with reductions for excessive unaccounted-for flow.
- 14.258 The Department's calculations for Oak Brook Terrace were lower than the community's from 1985 to 1990 and higher from 2000 to 2020. The Department's calculations in the initial years were deemed more realistic. The community's lower projected water demands were used from 2000 to 2020.
- 14.259 The Department used its own calculations for Prospect Heights because they reflected a more realistic future water service area.
- 14.260 Consumptive Use
- 14.261 When Keifer prepared his recommended allocations, he

estimated consumptive use at 6% (Ex. 5, p. I-4; Table I-1, p. I-11). Keifer applied this 6% correction factor against all domestic pumpage because this water is consumed, does not flow past Lockport, and need not be included in determining compliance with the total permissible 3200 cfs of Lake Michigan water (R. 77, 204).

14.262 Staff from the Department provided an independent evaluation of consumptive use. In 1970 the Great Lakes Basin Framework Study estimated consumptive use at 11.1% of withdrawals, increasing to 16.6% in 1980, 30.1% in 2000 and 38.4% in 2020 (R. 5241). For municipal uses only the estimates were much lower at 9.2% in 1970, 9.9% in 1980, 10.5% in 2000, and 11.1% in 2020 (R. 5241). In 1975 the U.S. Water Resources Council estimated consumptive use from central distribution systems in the Chicago Metropolitan area at 10.6% (R. 5242). This figure was projected to remain constant through 2000 (R. 5242). In 1975 the U.S. Geological Survey estimated consumptive use from public water supplies in the Great Lakes Basin at 13.2%.

14.263 The Department finds that consumptive use can be projected at 10% over the 40 year period of this allocation. The Department has calculated this allowance only for those communities' whose effluent is discharged through Lockport. This limitation has been placed on the consumptive use credit because of the limitations in paragraph 3 of the revised U.S. Supreme Court decree which requires measurement at Lockport to determine compliance with the total Illinois diversion of 3200 cfs.

14.300 Direct Diversion

14.310 The allocations for the Metropolitan Sanitary District of Greater Chicago (MSD) are unique. MSD's demands are based on the amounts of Lake Michigan water needed to meet navigation requirements, to maintain the Sanitary and Ship Canal in a reasonably satisfactory sanitary condition, and to meet water quality standards in the Sanitary and Ship Canal. Navigational requirements are met through allocations for lockage, leakage, and navigational make-up. The other requirements are met through an additional allocation for discretionary dilution.

14.320 Lockage

- 14.321 Lockage water enters the Chicago River at the Chicago River Controlling Works (CRCW) and the Calumet River at the O'Brien Lock and Dam (O'Brien) (Ex. 5, p. III-7). Water enters the locks at these locations to allow watercraft to navigate the normal difference in elevation between the higher level of Lake Michigan and the lower levels in the Chicago Sanitary and Ship Canal and the Calumet-Sag Channel (Ex. 5, p. III-8). Each lockage is recorded and calculated on a daily basis according to a formula. The formula is based on the total water surface area in each lock used, the difference between upstream and downstream water levels, and the number of lockages each day (Ex. 5, p. III-8). Keifer examined lockage water use data from 1972 to 1979 and found that the average amount was 152 cfs (Ex. 5, Table III-1, p. III-11). The greatest amount (46%) of this use occurs during June, July and August (Ex. 5, p. III-11).
- 14.322 The future amount of water needed for lockage was estimated by Keifer based on fluctuations in the levels of Lake Michigan, the number of waterway craft using the locks, and the operating levels in the downstream waterways (Ex. 5, p. III-14). Since Lake Michigan levels have been higher from 1972 to 1979 than their average since 1876, lockage has been higher recently than it would have been if these levels were closer to their long-term average (Ex. 5, p. III-15).
- 14.323 The number of waterway craft using CRCW has varied widely over the past 30 years, has diminished to an average of 25,000 craft per year in the last five years, and is expected to increase moderately in the future (Ex. 5, p. III-15). No long term data was available on the number of watercraft using O'Brien, but the number of lockages there has remained between 9,000 and 10,000 per year since the facility opened 20 years ago (Ex. 5, p. III-15). Keifer estimated that the total number of watercraft could increase by 19% if two new planned boat storage facilities are constructed and used to their capacity. These additional watercraft would account for an increase of 10% in lockage water use. (Ex. 5, p. III-17). Commercial traffic through O'Brien could increase if duplicate locks are constructed downstream at Lockport. At the present time, there are no plans for duplicate locks. The Army Corps of Engineers estimated that construction of this project would

account for a 20% increase in the number of upbound and downbound passes through O'Brien. This increase can be translated to an increase of 37.9% in yearly craft use at O'Brien (Ex. 5, p. III-17).

- 14.324 The operating levels of both downstream canals have been maintained at average levels which are slightly lower than the levels which will be adequate for flood control when the Tunnel and Reservoir Plan (TARP) is completed by MSD. If these operating levels are raised, the yearly average lockage water use could be reduced by 9% to 37% (Ex. 5, p. III-18).
- 14.325 In order to place all this data in a 40-year framework, a computer simulation was used to calculate a 40-year moving average of lake levels and lockage water use related to those levels (Ex. 5, p. III-18, Table III-4). This simulation showed a mean use of 94.4 cfs. Projected increases in navigation over the next 40 years raised this figure to a moving average of 109.3 cfs. This moving average was then increased by 1.65 times the standard deviation of the 109.3 cfs 40-year moving average for a resultant value of approximately 130 cfs with a confidence level of 95% that this value will not be exceeded (Ex. 5, p. III-18). This figure does not include any reductions which may result from higher operating levels in the downstream canal levels. Consequently, it may be conservatively high.
- 14.326 MSD requested a lockage allocation of 155 cfs because this was the amount determined in the Department's last allocation (R. 5367). MSD felt that the lake levels from 1860 through 1899 and in recent years, which were higher than the 104 year average used by Keifer, may be more typical. These higher levels would result in a higher amount of lockage water use (R. 5369). The higher lake levels from 1860 to 1899 may have occurred because they predated the diversion at Chicago (R. 5387). Since the period Keifer used includes the 1920's and the 1930's when the diversion was greater than it is today, it may include some periods when lake levels were abnormally low (R. 5402), but this should have a minimal effect on the future lockage calculations (R. 132).
- 14.327 The Department concludes that Keifer's method is the better of the two. By examining lake levels over a 104 year period, a wider range of circumstances is considered. The lockage figures in the Department's last allocation are not an appropriate measure in this

case because this allocation is based on a much longer 40 year period.

14.330 Leakage

14.331 The flow of water from Lake Michigan into the Illinois Waterway occurs at three points. Two of these points were described in the preceding discussion of lockage water use. The third point is located at Wilmette where the North Shore Channel meets Lake Michigan. Since these three controlling structures cannot economically be completely sealed, leakage occurs (Ex. 5, p. III-19).

14.332 Leakage at all three points is estimated by examining the relationship between the levels of Lake Michigan and the downstream waterways. These estimates show values ranging from 18 to 21 cfs at CRCW from 1972 to 1979, excluding 1973 and 1974 when lake levels were abnormally high (Ex. 5, Table III-5, p. III-20). Leakage at O'Brien has ranged from 9 to 14 cfs from 1972 to 1979 (Ex. 5, Table III-5, p. III-20). These estimates are corrected downward to reflect the times when lockage occurs (Ex. 5, p. III-19). Leakage at Wilmette averaged 111 cfs before 1972, was reduced to 40 to 50 cfs in 1972 through the addition of steel plates, and was further reduced with caulking in 1978 (Ex. 5, p. III-19). Present leakage at Wilmette is estimated at 3 to 4 cfs (Ex. 5, Table III-5, p. III-20).

14.333 Future leakage was calculated by means of equations which used present average leakage amounts at each point, the difference between the levels of the Lake and the downstream waterways, and a projected number of lockages at CRCW and O'Brien based on the present relationship between the number of watercraft and the number of lockages (Ex. 5, p. III-21). The calculations showed maximum leakage of 55.8 cfs at maximum lake levels, a minimum of 11.0 cfs at low lake levels, and an average of 36.7 cfs using 104 years of lake levels (Ex. 5, p. III-21, Table III-4). Using a 40 year moving average, leakage was estimated at 31.4 cfs. Keifer recommended that the leakage allocation be set at 30 cfs because of the projected increases in navigation and lockages at CRCW and O'Brien (Ex. 5, p. III-21).

14.334 Keifer's estimates did not include any increases due to the increased age of the three intake structures or any periods when the plates might be removed at Wilmette (R. 138).

- 14.335 MSD requested a leakage allocation of 74 cfs because this was the amount established in the Department's last allocation (R. 5360). MSD felt that the three intake structures would become less efficient over the next 40 years (R. 5361). MSD felt there was no reason to believe that the recently high lake levels, which cause greater leakage, would recede to their long-term average (R. 5362). MSD doubted the present leakage values at Wilmette because a recent test showed leakage of 10 cfs (R. 5364).
- 14.336 Since the caulking at Wilmette, which keeps present leakage low, deteriorates; it must be replaced periodically to maintain present leakage values (R. 5367). MSD's present estimate of leakage at Wilmette is based on only one test (R. 5391). The plates at Wilmette will be removed only when Lake levels drop much lower than they are today (R. 5393). If they are removed, the Lake Michigan water flowing through Wilmette would be categorized as discretionary dilution water and not as leakage (R. 5395). These plates have not been removed since 1977, and they will be recaulked each time they are replaced (R. 5470). CRCW is presently being maintained and rebuilt on an as needed basis (R. 5485). CRCW is expected to remain in use for another 60 years (R. 5474).
- 14.337 The formulas used by Keifer to estimate present leakage are the same as the formulas used by MSD (R. 5493).
- 14.338 The Department concludes that Keifer's method is the better of the two. By examining Lake levels over a 104 year period, a wider range of circumstances is considered. The leakage figures in the Department's last allocation are not an appropriate measure in this case for two reasons. First, this allocation is based on a much longer 40 year period. Second, the last allocation did not consider the recently improved sealing at Wilmette. The Department was not presented with any evidence to show why the three intake structures should become any less efficient over the next 40 years. If the plates are removed at Wilmette, the resulting leakage will be less than present estimates. The use of Lake Michigan water during these periods will be designated as discretionary dilution. Consequently, there will be no leakage during these periods. Section 820.307 (c) (9) of the Rules requires MSD to reduce leakage to a reasonable minimum. This rule requires MSD to maintain its intake structures and

control leakage at the present estimated levels. MSD's single recent test of leakage below Wilmette does not provide a significant data base for the next 40 years.

14.340 Navigational Make-Up

14.341 Rainfall in the Chicago Metropolitan region accounts for increased flows into the Sanitary and Ship Canal, the Calumet-Sag Channel, the North Shore Channel, and the Chicago River. Whenever rainfall is predicted, MSD releases water at Lockport to provide additional capacity in the river-canal system to mitigate flood damage. If the rainfall does not occur or is less than it was anticipated to be, Lake Michigan water must be diverted to raise levels up to those required for navigation. The water allocated for this purpose is referred to as navigational make-up water (Ex. 5, p. III-22, R. 5371).

14.342 MSD gathers data on predicted and actually occurring rainfall to determine how much water should be released at Lockport (Ex. 5, p. III-22). Rainfall events are grouped according to their predicted and actual severity with related canal elevations which should be maintained (Ex. 5, Table III-6, p. III-23). The resulting amount of navigational make-up water needed after the rainfall event has passed depends on the reliability of the weather forecasts (R. 244). Over the past 10 years, MSD has reported an annual average of 95 cfs for navigational make-up with a minimum of 56 cfs in 1971 and a maximum of 149 cfs in 1979 (Ex. 5, p. III-24, Table III-7). The value reported for 1977 (133 cfs) includes some make-up water used to maintain upstream water levels during embankment repair near Lockport (Ex. 5, p. III-24).

14.343 Keifer stated that reductions in the use of navigational make-up should occur upon completion of the Tunnel and Reservoir Plan (TARP) (Ex. 5, p. III-25). Keifer estimated these reductions by calculations which evaluated the added storm water storage capacity of TARP Phase I and compared this with a study of 72 storm events (Ex. 5, p. III-25). Keifer examined the amounts of navigational make-up water used, the predicted rainfall, the actual rainfall and the average discharges at three points in the river-canal system (Ex. 5, p. III-25). Keifer estimated a three-step improvement in efficiency in the present storm management system after completion of TARP Phase I, but recommended that a

conservative two-step improvement be used for future allocations (Ex. 5, p. III-26, R. 207). This approach resulted in a 70% reduction in the need for navigational make-up water after completion of TARP Phase I. This 70% reduction translates into an average of 30 cfs as compared to the present average of 95 cfs.

- 14.344 MSD requested an allocation of 146 cfs for navigational make-up from 1981 through 2020 (App.).
- 14.344.1 MSD felt that Keifer's conclusions that high flows in the Little Calumet River and the North Branch of the Chicago River would reduce the need for navigational make-up water were unfounded (R. 5373).
- 14.344.2 MSD felt that Keifer's analysis of 72 storm events had not included any events in which rainfall was predicted but none occurred.
- 14.344.3 MSD pointed out that navigational make-up was estimated prior to 1977 and that a 40 year projection should not be made with only three years of actual data. Consequently, MSD felt that the highest single year of actual recorded flows (1979) should be used (R. 5372).
- 14.344.4 MSD quoted the Department's last allocation as authority for the conclusion that the present canal system accounts for storage of only 0.06 inches of rain (R. 5374, 5416). Based on this, MSD estimated that the additional storage capacity of TARP Phase I would increase the total amount of rainfall which could be stored to 0.22 inches of rain. Since the only storm events which prompt a response by MSD are those which are predicted to exceed 0.2 inches of rain, MSD feels that TARP Phase I will have a minimal effect on future needs for navigational make-up (R. 5375).
- 14.345 MSD has misconstrued the meaning of the Department's last allocation and the method employed by Keifer.
- 14.345.1 Keifer stated that high flows in the Little Calumet River and the North Branch of the Chicago River would reduce the need for navigational make-up water (Ex. 5, p. III-25) but the calculations which were done by Keifer to estimate future needs for navigational make-up are not consistent with this conclusion. Exhibit 6 shows the backup data and calculations Keifer used. This document shows that a positive coefficient (0.245838) was multiplied by the average flow of the

North Branch in the equation stated on page III-25 of Exhibit 5. This would tend to increase the amount of navigational make-up water needed just as MSD has suggested. Exhibit 6 also shows that a negative coefficient (-0.548921) was multiplied by the average flow of the Little Calumet River in the equation on page III-25 of Exhibit 5. This would tend to decrease the amount of navigational make-up water needed which is what MSD is objecting to. MSD's objection fails to point out that the map it provided to the Department in Exhibit 90 shows that the Little Calumet River meets the Calumet River at a very short distance downstream from the O'Brien Lock and Dam. When the flow from the Little Calumet River is high, the Calumet River has a reduced capacity for accepting any additional downstream flow. Consequently, the nearby O'Brien Lock and Dam is not able to accept additional navigational make-up water from Lake Michigan during these periods.

- 14.345.2 A review of Exhibit 6 shows that out of 72 storm events studied by Keifer, no actual rainfall occurred in 11 of those events. Consequently, MSD's objections to Keifer's study are simply unfounded.
- 14.345.3 When MSD asked the Department to base a 40 year allocation for navigational make-up water on one year of measured data, it failed to point out that the estimates of navigational make-up water from 1970 through 1976 and the calculated amounts from 1977 to 1979 were provided by MSD itself (R. 141).
- 14.345.4 In the last allocation, the Department concluded that "... the maximum flood control storage volume of the Canal ... is only equivalent to .06 inches of precipitation as runoff ... " (In the Matter of: Lake Michigan Water Allocation, LMO 77-1 at page 23). This does not mean that the present canal system can store only .06 inches of rain as MSD contends. The .06 inches refers to the amount of rainfall which winds up as runoff. When Keifer prepared the estimates for the stormwater runoff reserve, he concluded that under present conditions only 30.6% of rainfall in the Chicago area winds up as runoff (Ex. 5, p. III-29, Table III-8). By simple calculations this means that the present canal system can store approximately 0.2 inches of rainfall. This value (0.2 inches of rainfall) is the same as the one used by MSD as the predicted amount of rainfall which triggers a drawdown in canal levels at Lockport (R. 5375). MSD stated that the completion of

TARP Phase I would result in storage of an additional 0.16 inches of rainfall (R. 5375). Consequently it would appear that by MSD's own admissions, it has concluded that TARP Phase I will indeed have a significant impact on the future need for navigational make-up water.

14.346 Keifer concluded that TARP Phase I would be completed by 1987 based on information received from MSD (R. 146). IEPA testified that the presently funded portions of TARP would be completed by December of 1984 (R. 9389) and that the remaining portion of TARP Phase I would not be completed until 2000 (R. 9390).

14.347 MSD testified that the presently funded portion of TARP would store an additional 0.08 inches of rainfall and that the remaining or unfunded portion of TARP would accommodate an additional 0.08 inches of rainfall (R. 5419). These values are apparently based on rainfall over the entire 673 square mile watershed instead of the 310 square mile combined sewer area to be served by TARP.

14.348 IEPA described the funded portion of TARP Phase I as the main stream system and pump station and the Cal Sag Leg and pump station (R. 9389). In testimony presented in the last allocation, MSD estimated the storage of this portion of TARP at 2906 acre feet.

14.349 Using the same method of calculation as the one employed by Keifer, the Department has calculated that completion of funded TARP Phase I will result in a one step improvement in storm management. This improvement will result in a 43.5% reduction in navigational make-up needs for an interim allocation of 55 cfs starting in 1986. After 2000 this allocation has been reduced to 30 cfs as suggested by Keifer. It should be emphasized that these reductions are conservative since Keifer's calculations project a greater improvement in storm management from the completion of TARP Phase I. The Department believes that Keifer's approach, with the revised timetable noted above, is superior to MSD's because it examines a broader range of previous navigational make-up flows.

14.350 Discretionary Dilution

14.351 All of the Lake Michigan water diverted directly into the river-canal system has a positive impact on water quality in the system. The Department has allocated

discretionary dilution water in addition to the amounts for lockage, leakage, and navigational make-up water to satisfy the need to maintain the Sanitary and Ship Canal in a reasonably satisfactory sanitary condition and to meet water quality standards in the Sanitary and Ship Canal. Unlike other allocations, the Department's discretion is limited in this area. Section 3 of the Act and paragraph 5 of the revised U.S. Supreme Court decree state that no more than 320 cfs can be allocated for these purposes. Section 3 of the Act also states that the Department shall not allocate less than 320 cfs for discretionary dilution before October 1, 2000 unless notification is received from IEPA that improved wastewater treatment facilities have been completed or there has been a change in water quality standards.

- 14.352 The Department's consultant used a computer simulation to project the water quality conditions in the river-canal system above Lockport (Ex. 5, pp. III-31 to III-66). Keifer examined a number of different alternative combinations of pollution abatement facilities to determine the different amounts of Lake Michigan water needed under each alternative to meet the Illinois Pollution Control Board's water quality standards. Rather than evaluate each alternative projection, the Department has examined the conditions which can be expected beyond 2000. The year 2000 was selected because this is the earliest point the Department is allowed any discretion at this time under the present constraints of Section 3 of the Act.
- 14.353 IEPA testified that by 2000, the 10 station instream aeration system (R. 9387) and TARP Phase I (R. 9390) would be completed. Keifer estimated that with these facilities in place, the average annual amount of discretionary dilution required during dry weather to maintain compliance with the water quality standards would be 50 cfs (Ex. 5, Table III-23, p. III-55). This amount is considerably lower than the Department's allocation for this use after 2000. The explanation follows here.
- 14.354 Keifer's estimates of the need for discretionary dilution were based on the United States Environmental Protection Agency's (USEPA's) Qual II water quality simulation model (the model) (Ex. 5, p. III-33).

14.354.1 The model is steady-state and therefore estimates conditions at one flow rate (R. 112). Keifer felt that average flow conditions were a better indicator than low flow conditions (R. 116). Keifer felt that there was very little difference in water quality conditions between periods of low and average flow in the river-canal system (R. 287-288).

14.354.2 The model divided the following waterways into 37 reaches, varying in length from 0.5 miles to 9.5 miles, and examined the characteristics of each reach:

- North Shore Channel
- North Branch of the Chicago River
- Chicago River
- South Branch of the Chicago River
- Sanitary and Ship Canal
- Little Calumet River
- Calumet-Sag Channel (Ex. 5, p. III-34)

14.354.3 The model had to be modified to allow for calculation of the impact of discretionary dilution on more than 15 individual reaches and to eliminate the averaging of the reaeration coefficient. This second modification was needed to provide for the impact of 90% dissolved oxygen saturation from the 10 aeration stations (Ex. 5, p. III-34). The model also examined conditions at Wolf Point and Sag Junction (Ex. 5, p. III-34). Eight tributaries of wastewater flows were evaluated. They are as follows:

- North Side Treatment Works
- North Branch of the Chicago River
- West-Southwest Treatment Works
- Grand Calumet River
- Calumet Treatment Works
- Tinley Creek
- Lemont Treatment Plant (Ex. 5, p. III-35)

14.354.4 The results of the model were calibrated by examining one actual event (June 20, 1978) with higher than average flows and one event (July 5, 1977) with lower than average flows (Ex. 5, p. III-37). The model assumed that no nitrification occurred in the waterways above Lockport (Ex. 5, p. III-37). Values for benthic oxygen demand (the effect of bottom sediment deposits, initial values provided by MSD) were used as the calibration coefficient (Ex. 5, p. III-37). These values were used as the variable for adjustments between

simulated and reported conditions because other similar studies had used benthic oxygen demands for this purpose (R. 112).

- 14.354.5 The model was intended to determine the average amount of Lake Michigan water which would have to be provided at each of the three intakes to maintain a minimum dissolved oxygen concentration of 4.0 mg/l in each waterway except for the North Shore Channel above its junction with the North Branch of the Chicago River. In this area the concentration was 5.0 mg/l (Ex. 5, p. III-50). Keifer assumed 90% oxygen saturation at each aerator and reduced benthic oxygen demand after the completion of TARP I (Ex. 5, p. III-51). Keifer also assumed that TARP I would not change existing tributary flows or quality (Ex. 5, p. III-51). In the final analysis, Keifer assumed average lockage flows of Lake Michigan water of 108 cfs and average leakage flows of 37 cfs (Ex. 5, p. III-53, R. 152). Flows of navigational make-up water were not included because they are periodic and not available continually (Ex. 5, p. III-52).
- 14.355 MSD requested an allocation of 320 cfs for discretionary dilution over the entire 40 year period because this was the amount allocated in the Department's last allocation for 1980 (R. 5378). MSD felt that 320 cfs would not be adequate to meet all of the Pollution Control Board's water quality standards unless pollution abatement facilities in addition to instream aeration were constructed (R. 5381). MSD stated that discretionary dilution was already responsible for compliance with dissolved oxygen standards in some areas and could mitigate violations with respect to other parameters such as floating debris, oil, color, and fecal coliform bacteria (R. 5421). MSD's own modeling continues to show that dissolved oxygen is the critical parameter which requires the greatest amount of discretionary dilution to meet water quality standards (R. 5427-5428). MSD felt that Keifer's estimate of 90% dissolved oxygen saturation from instream aeration was reasonable (R. 5440).
- 14.356 IEPA felt that Keifer's use of average dry weather flow was not valid because Pollution Control Board standards require compliance during 7 day in 10 year low flow conditions (R. 9373). IEPA objected to the conclusions in Keifer's modeling because it did not assess water quality impacts below Lockport (R. 9376, 9383). IEPA felt that it could not be assumed that nitrification

would not occur above Lockport after construction of TARP and improvements in MSD's sewage treatment abilities (R. 9378). If nitrification does occur above Lockport, the modeled oxygen demand could be too low (R. 9380). IEPA felt that Keifer should have used benthic demands calibrated during July 5, 1977 low flow conditions (R. 9381). IEPA questioned the validity of Keifer's selection of a decay coefficient under such a wide range of headwater flows (R. 9381-9382). IEPA felt that significant emphasis on instream aeration to meet dissolved oxygen standards under reduced flows ignores the impact of increased concentrations of other toxic parameters (R. 9385). IEPA warned that some of MSD's improvements in sewage treatment capacity and effluent quality may be deferred due to Federal funding reassessments (R. 9386-9391). IEPA has not done any modeling of its own to test Keifer's accuracy (R. 9414).

- 14.357 The Department believes it would not be prudent to limit discretionary dilution to 50 cfs after the year 2000. Too many of the assumptions and values contained in the modeling may be changed as additional pollution abatement facilities come on line and new data is generated. The Department is required to consider the water quality of the waterways which were modeled. It is not clear whether the Department has any authority to base its decision here on impacts below Lockport since Section 3 of the Act states that only the Sanitary and Ship Canal should be the Department's concern. The Department sees no reason to reject Keifer's modeling because it is not based on 7 day in 10 year low flow conditions. The differences in results have been stated as minimal. The Department questions the use of a historical low flow standard in waterways whose levels and water quality conditions are artificially maintained to the degree presented here.
- 14.358 The Department is not going to follow Keifer's suggestion to use all of the accumulated reserve for discretionary dilution. Such a decision would inhibit the Department's future ability to provide for other increased demands and to insure that the statutory priority for domestic use is maintained.
- 14.359 Recognizing the uncertainties inherent in all the predictions conditioned in this allocation, the Department believes that allocations of 101 cfs for discretionary dilution in 2000, 2010 and 2020 reflects a reasonable balance between the available alternatives.

This was the value calculated in the Department's last allocation as the amount of discretionary dilution needed after completion of the instream aeration system and TARP Phase I. If this value turns out to be incorrect, the provisions of Section 820.310 (b) (4) of the Rules can be employed to provide for future modifications.

14.360 Hydroelectric Power Generation

14.361 MSD asked the Department to allocate unused Lake Michigan water for hydroelectric power generation at Lockport (R. 5375).

14.362 Since power generation is not specifically mentioned in the definition of domestic purposes contained in Section 1.1 of the Act, an allocation for this purpose simply is not authorized.

14.400 North Shore Sanitary District

14.410 The allocation provided for North Shore Sanitary District (NSSD) is based on an agreed circuit court order between the Department and NSSD (R. 922, Ex. 21). The amount (.310 MGD or .48 cfs) is based on a calculation of inflow and infiltration of Lake Michigan water into 16.92 miles of NSSD sewers which lie below the level of Lake Michigan (.26 cfs) and the stormwater diverted by 194 acres of combined sewer service area in Waukegan (.22 cfs) (R. 922).

14.420 These amounts have been calculated to remain at their present levels because there are no plans to build additional sewers adjacent to Lake Michigan (R. 929) and no plans to separate the combined sewers in Waukegan (R. 930).

14.500 Other Reserve

14.510 The Department has designated the remaining unallocated portion of the Illinois diversion as Other Reserve. These amounts will be allocated to provide for contingencies which may arise.

14.520 Some of the communities may find that reductions in unaccounted-for flow come from improvements in the overall accuracy of registration on their customers' water meters. This will result in higher justified demands.

- 14.530 The construction of regional water distribution systems may make Lake Michigan water the most economical source for some communities which were denied allocations here or did not apply.
- 14.540 The Department will also need a reserve to accommodate emergency allocations presented pursuant to Section 820.305 of the Rules. In an administrative review of the last allocation, the Illinois Supreme Court commented on the use of a reserve to provide for emergencies and stated in part as follows:
- "We think that no valid question can be raised as to the propriety of the Department's setting aside a reasonable amount of water for that purpose."
[Village of Riverwoods, et al. v. Department of Transportation et al., 77 Ill. 2d 130, 395 N.E. 2d 555 (1979)]
- 14.550 United States Steel withdrew its application for an allocation for its Waukegan Works and moved the Department to hold its present allocation in reserve until February 28, 1981. U.S. Steel was concerned whether or not a future purchaser of its discontinued wire drawing facility would be able to receive an allocation. The Department has denied U.S. Steel's motion because no specific request for a prospective use of this facility has been presented. If a new user of this facility needs raw Lake Michigan water for its operations as U.S. Steel did, the reserve will be one source for an allocation. A decision on this matter will have to be made after an initial application has been filed for this facility, notice is given, and a hearing is held in conformance with the Rules.
- 14.600 Future Modifications
- 14.610 Section 820.310 of the Rules provides that any entity may request a modification at any time. Section 820.310 (b) provides that modifications will be based on changes in circumstances; violation of a permit condition (e.g., overuse or failure to follow the conservation practices in Section 820.307); neglecting to use an allocation; notification from IEPA that completion of pollution abatement facilities or a change in water quality standards prompts a hearing so that the Department can consider a change; or a determination by the Department that a total reallocation is necessary.

- 14.620 This rule is necessary to provide for flexibility in handling an ongoing program of this magnitude. Future allocations are all made on predictions which are formed on assumptions and are subject to change. The Department recognizes the inherent difficulties in making accurate projections over a 40 year period.
- 14.630 The Rules provide that all modifications will be made after proper notice has been given and a hearing has been held.
- 14.700 Total Demands
- 14.710 The totals in the Order all show compliance with the 3200 cfs limitation in Section 3 of the Act and Paragraph 1 of the revised U.S. Supreme Court decree.
- 14.720 The initial accounting year is set to begin on October 1, 1980 because Paragraph 5 of the revised U.S. Supreme Court decree states that the 40 year period shall begin on the first day of October following the passage into law of certain amendments to the Act. These amendments were signed by Governor James R. Thompson on August 26, 1980 (Public Act No. 81-1411).
- 15.000 Duration of Permits
- 15.100 Section 820.308 of the Rules states that the duration of each allocation permit shall be stated on the face of the permit. The Department has adopted this rule under the general rulemaking authority of Section 9 of the act. All of the permits issued pursuant to this allocation shall run for the entire 40 year period.
- 15.200 The provisions of Sections 820.306 and 820.310 of the Rules will be available to accommodate future transfers and modifications of allocations.
- 15.300 The Department has elected to grant 40 year terms in each permit so that long term financial commitments can be made wherever construction of transmission systems is necessary (R. 7427), and each permittee can rely on a long term reliable source of supply.
- 16.000 Reporting
- 16.100 Section 820.309 of the Rules provides for reporting by each permittee. This rule was adopted by the Department pursuant to the general rulemaking authority in Section

9 of the Act. The forms which the Department will send to each permittee will be tailored to each permittee's circumstances.

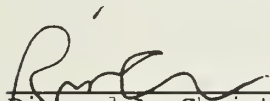
- 16.200 Reporting will advise the Department of the status of each permittee's compliance with the terms and conditions of its permit.
- 16.300 Paragraph 3 of the revised U.S. Supreme Court decree requires the State of Illinois to develop an accounting system, in conjunction with the U.S. Army Corps of Engineers, the United States Geological Survey, and a three member review committee, to determine compliance with the totals listed in Paragraph 3. If the new accounting system requires changes in individual reporting requirements, the Department's reporting forms will be revised to accommodate these changes.
- 17.000 Petitions for Reconsideration or Rehearing of this Allocation
- 17.100 Section 820.214 of the Rules provides that any party may petition for reconsideration or a rehearing of this decision within 30 days of today's date.
- 17.200 Four copies of any such petition must be filed with the Hearing Officer. Copies of these petitions will be available for public inspection. Consequently, they need not be served on each party of record.
- 17.300 Petitions for reconsideration shall be limited to a review of evidence which was part of the record in this proceeding.
- 17.310 Some of the communities receiving partial allocations based on continued shallow well use may want to consider asking the Department to grant full allocations.
- 17.400 Petitions for rehearing shall be limited to a review of newly discovered evidence which is relevant to this proceeding but for some reason could not be presented before the record closed on October 15, 1980. Each petition for rehearing shall be supported by an affidavit stating why new evidence could not be presented timely.

ORDER

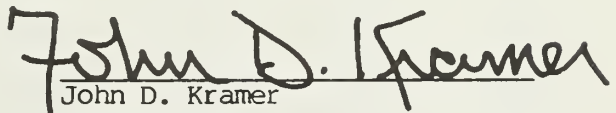
1. Each applicant for an allocation of water from Lake Michigan is hereby granted an allocation in the amount set forth in Appendix A and Appendix B for each of the next 40 annual accounting periods. Annual accounting periods begin on October 1 of each previous year and continue through the last day of September of the year. Allocations in intervening years shall be determined by straight line interpolation.
2. Each applicant receiving an allocation shall receive an allocation permit. Each permit shall be effective only upon receipt by the Department of an executed acceptance slip within 30 days of the date of permit issuance.
3. Each permittee shall comply with the appropriate reporting requirements in Section 820.309 of the Rules.
4. Each permittee in Category IA and Category IIB shall comply with the requirements of Sections 820.307 (b), (c) (1)-(7), and (e) of the Rules.
5. Within 90 days of receipt of an allocation permit, each permittee which uses any water from deep aquifer pumpage shall submit to the Department for review and approval a phased program to end this practice.
6. Each permittee in Category IB and Category IIA shall comply with Section 820.307 (c) (9) of the Rules.
7. United States Steel Corporation's motion to hold the allocation for its Waukegan Works in reserve until February 28, 1981 is hereby denied.

RECOMMENDED:

APPROVED:



Richard A. Christopher
Hearing Officer



John D. Kramer
Secretary

Dated this 15th day of December, 1980

ALLOCATION OF LAKE MICHIGAN WATER FOR THE
ACCOUNTING YEARS 1981 - 2020

All allocated quantities are shown in million gallons per day (MGD)

	<u>Addison</u>	<u>Alsip</u>	<u>Arlington Heights</u>	<u>Aurora</u>	<u>Bannock- burn</u>	<u>Bartlett</u>	<u>Beach Park San. Dist.</u>
1981	0.000	3.236	0.000	0.000	0.281	0.000	0.650
1982	0.000	3.300	0.000	0.000	0.292	0.000	0.660
1983	0.000	3.364	0.000	0.000	0.303	0.000	0.670
1984	0.000	3.428	8.316	0.000	0.314	1.450	0.680
1985	4.717	3.494	8.350	0.000	0.326	1.490	0.690
1986	4.728	3.559	8.384	0.000	0.347	1.529	0.700
1987	4.791	3.625	8.418	0.000	0.368	1.569	0.710
1988	4.854	3.692	8.452	0.000	0.388	1.608	0.720
1989	4.917	3.759	8.486	0.000	0.409	1.648	0.730
1990	4.980	3.827	8.520	14.490	0.430	1.688	0.740
2000	5.655	4.177	8.850	19.510	0.448	2.051	0.840
2010	5.637	4.261	9.180	21.010	0.500	2.079	0.940
2020	5.830	4.622	9.500	21.450	0.521	2.186	1.040
	<u>Bedford Park</u>	<u>Bensen- ville</u>	<u>Berkeley</u>	<u>Berwyn</u>	<u>Blooming- dale</u>	<u>Blue Island</u>	<u>Boling- brook</u>
1981	10.516	0.000	0.662	3.651	0.000	3.001	0.000
1982	10.542	0.000	0.668	3.666	0.000	3.006	0.000
1983	10.569	0.000	0.673	3.641	0.000	2.977	0.000
1984	10.595	0.000	0.679	3.616	0.000	2.949	0.000
1985	10.622	2.549	0.685	3.591	2.012	2.921	0.000
1986	10.645	2.543	0.687	3.565	2.044	2.887	0.000
1987	10.668	2.564	0.689	3.577	2.135	2.885	0.000
1988	10.691	2.585	0.692	3.590	2.227	2.883	0.000
1989	10.714	2.607	0.694	3.603	2.319	2.880	0.000
1990	10.755	2.628	0.696	3.617	2.411	2.877	0.000
2000	11.027	2.855	0.688	3.672	3.553	2.808	0.000
2010	11.306	2.857	0.699	3.722	3.538	2.853	0.000
2020	11.585	2.936	0.754	4.014	3.607	3.089	0.000

	<u>Bridge-view</u>	<u>Broad-view</u>	<u>Brook-field</u>	<u>Buffalo Grove</u>	<u>Burnham</u>	<u>Burr Ridge</u>	<u>Calumet City</u>
1981	2.434	1.996	1.842	0.000	0.439	0.390	4.714
1982	2.489	2.004	1.840	0.000	0.441	0.495	4.717
1983	2.545	1.989	1.838	0.000	0.443	0.784	4.719
1984	2.600	1.975	1.836	2.456	0.445	0.900	4.722
1985	2.656	1.961	1.834	2.594	0.447	1.004	4.724
1986	2.711	1.942	1.832	2.717	0.449	1.120	4.726
1987	2.766	1.943	1.829	2.840	0.451	1.237	4.728
1988	2.820	1.945	1.826	2.964	0.453	1.353	4.730
1989	2.875	1.946	1.824	3.087	0.455	1.470	4.731
1990	2.930	1.948	1.821	3.210	0.457	1.586	4.733
2000	3.256	1.926	1.764	4.487	0.457	2.505	4.685
2010	3.312	1.946	1.788	4.507	0.466	2.706	4.766
2020	3.587	2.031	1.918	4.920	0.504	2.852	5.147
	<u>Calumet Park</u>	<u>Carol Stream</u>	<u>Central Stickney San. Dist.</u>	<u>Chicago</u>	<u>Chicago Heights</u>	<u>Chicago Ridge</u>	<u>Cicero</u>
1981	0.878	0.000	0.136	808.498	0.000	1.291	9.820
1982	0.883	0.000	0.136	808.577	0.000	1.307	9.837
1983	0.878	0.000	0.137	800.352	0.000	1.312	9.742
1984	0.874	0.000	0.137	792.126	6.658	1.313	9.650
1985	0.869	2.294	0.137	785.559	6.637	1.315	9.559
1986	0.865	2.394	0.137	777.331	6.615	1.316	9.471
1987	0.870	2.493	0.138	777.406	6.665	1.332	9.486
1988	0.875	2.593	0.138	777.481	6.716	1.347	9.502
1989	0.880	2.693	0.138	777.556	6.766	1.363	9.518
1990	0.885	2.793	0.138	777.632	6.817	1.379	9.533
2000	0.912	3.916	0.139	777.765	6.996	1.475	10.005
2010	0.925	4.004	0.143	777.900	7.076	1.502	10.158
2020	0.997	4.178	0.155	777.900	7.455	1.621	11.032

	(Citizens		Utilities				Company)
	<u>W. Suburb/ Santa Fe</u>	<u>Arbury Serv. Area</u>	<u>Arrow- head</u>	<u>Lom- bard</u>	<u>Valley View</u>	<u>Way- cinden</u>	<u>Fernway</u>
1981	0.000	0.000	0.000	0.000	0.000	0.000	0.335
1982	0.000	0.000	0.000	0.000	0.000	0.000	0.372
1983	0.000	0.000	0.000	0.000	0.000	0.000	0.405
1984	0.000	0.000	0.000	0.000	0.000	0.567	0.438
1985	0.000	0.000	0.201	0.074	0.871	0.565	0.470
1986	0.000	0.000	0.204	0.074	0.871	0.562	0.503
1987	0.000	0.000	0.207	0.074	0.880	0.566	0.541
1988	0.000	0.000	0.209	0.074	0.890	0.569	0.580
1989	0.000	0.000	0.212	0.074	0.899	0.573	0.619
1990	0.000	0.000	0.215	0.074	0.908	0.577	0.660
2000	0.000	0.000	0.244	0.074	1.011	0.599	0.912
2010	0.000	0.000	0.245	0.074	1.014	0.610	0.934
2020	0.000	0.000	0.253	0.074	1.044	0.645	1.007

	<u>(Citizens Utilities Co.)</u>						
	<u>Country Club Highlands</u>	<u>Chicago Suburban</u>	<u>Clarendon Hills</u>	<u>Country Club Hills</u>	<u>Country- side</u>	<u>Crest wood</u>	<u>Crete</u>
1981	0.000	0.000	0.000	0.000	0.753	0.915	0.000
1982	0.000	0.000	0.000	0.000	0.763	0.933	0.000
1983	0.000	0.000	0.000	0.000	0.765	0.951	0.000
1984	0.000	1.953	0.000	1.536	0.767	0.969	0.000
1985	0.132	1.961	0.787	1.577	0.769	0.987	0.000
1986	0.131	1.970	0.789	1.614	0.771	1.002	0.000
1987	0.131	2.000	0.799	1.652	0.781	1.017	0.000
1988	0.132	2.030	0.809	1.691	0.792	1.033	0.000
1989	0.132	2.060	0.819	1.729	0.802	1.048	0.000
1990	0.133	2.090	0.830	1.767	0.813	1.063	0.000
2000	0.135	2.247	0.931	2.003	0.868	1.169	0.000
2010	0.136	2.290	0.931	2.049	0.884	1.227	0.000
2020	0.140	2.477	0.931	2.225	0.955	1.286	0.000

	<u>Darien</u>	<u>Deer- field</u>	<u>Delmar Woods</u>	<u>Des Plaines</u>	<u>Dixmoor</u>	<u>Dolton</u>	<u>Domestic Utilit. Co.</u>
1981	1.024	2.438	0.022	7.811	0.352	3.196	2.500
1982	1.071	2.484	0.022	7.900	0.353	3.188	2.600
1983	1.120	2.531	0.022	7.900	0.349	3.180	2.700
1984	1.169	2.577	0.022	7.900	0.346	3.171	2.800
1985	1.219	2.623	0.022	7.901	0.343	3.161	2.900
1986	1.270	2.649	0.022	7.865	0.340	3.150	2.940
1987	1.321	2.675	0.022	7.915	0.340	3.138	2.980
1988	1.373	2.702	0.022	7.965	0.341	3.126	3.020
1989	1.426	2.728	0.022	8.016	0.341	3.112	3.060
1990	1.480	2.754	0.022	8.066	0.342	3.098	3.100
2000	2.057	2.765	0.022	8.338	0.340	2.919	3.500
2010	2.058	2.800	0.023	8.487	0.345	2.970	3.800
2020	2.114	2.800	0.025	9.176	0.371	3.208	4.000
	<u>Downers Grove</u>	(Du Page <u>Hinswood</u>	County <u>Lake-in- the-woods</u>	Public <u>Farming- dale</u>	Works <u>Rosewood Trace</u>	Service <u>Steeple Run</u>	Areas) <u>Glen Ellyn Heights</u>
1981	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1982	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1983	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1984	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1985	5.967	0.408	0.179	0.000	0.000	0.000	0.000
1986	6.022	0.430	0.179	0.000	0.000	0.000	0.000
1987	6.136	0.452	0.181	0.000	0.000	0.000	0.000
1988	6.250	0.475	0.183	0.000	0.000	0.000	0.000
1989	6.364	0.497	0.185	0.000	0.000	0.000	0.000
1990	6.479	0.519	0.186	0.175	0.432	0.065	0.115
2000	7.785	0.647	0.195	0.195	0.481	0.070	0.117
2010	7.772	0.647	0.195	0.196	0.480	0.075	0.118
2020	7.961	0.647	0.200	0.202	0.493	0.075	0.121

	<u>East Hazel Crest</u>	<u>Elk Grove Village</u>	<u>Elmhurst</u>	<u>Elmwood Park</u>	<u>Evanston</u>	<u>Ever- green Park</u>	<u>Fern- dale Heights</u>
1981	0.129	0.000	0.000	2.670	11.982	2.729	0.000
1982	0.130	0.000	0.000	2.665	12.012	2.743	0.000
1983	0.131	0.000	0.000	2.630	12.042	2.758	0.000
1984	0.133	6.766	0.000	2.595	12.072	2.772	1.683
1985	0.134	6.976	5.819	2.561	12.102	2.786	1.779
1986	0.136	7.105	5.859	2.527	12.131	2.800	1.874
1987	0.137	7.235	5.899	2.521	12.160	2.814	1.970
1988	0.139	7.364	5.940	2.515	12.188	2.828	2.067
1989	0.140	7.494	5.981	2.508	12.217	2.841	2.163
1990	0.142	7.623	6.021	2.501	12.246	2.854	2.260
2000	0.151	8.607	6.362	2.412	12.001	2.871	2.876
2010	0.154	9.137	6.348	2.445	12.001	2.918	2.944
2020	0.166	9.630	6.499	2.640	12.001	3.140	3.198
	<u>Floss- moor</u>	<u>Forest Park</u>	<u>Forest View</u>	<u>Franklin Park</u>	<u>Garden Homes San. Dist</u>	<u>Glenbrook Countryside Manor</u>	<u>Glencoe</u>
1981	0.000	2.116	0.228	6.304	0.093	0.073	1.883
1982	0.000	2.120	0.228	6.359	0.093	0.073	1.891
1983	0.000	2.101	0.228	6.414	0.093	0.073	1.898
1984	1.140	2.082	0.228	6.470	0.093	0.073	1.906
1985	1.164	2.063	0.234	6.527	0.095	0.073	1.913
1986	1.188	2.043	0.236	6.580	0.095	0.073	1.921
1987	1.225	2.046	0.237	6.634	0.095	0.073	1.929
1988	1.262	2.048	0.239	6.688	0.095	0.073	1.936
1989	1.300	2.051	0.240	6.743	0.095	0.073	1.944
1990	1.338	2.053	0.242	6.799	0.095	0.073	1.952
2000	1.561	2.047	0.232	7.024	0.104	0.073	2.028
2010	1.596	2.073	0.232	7.147	0.104	0.073	2.028
2020	1.729	2.220	0.232	7.765	0.104	0.073	2.028

	<u>Glendale Heights</u>	<u>Glen Ellyn</u>	<u>Glenview</u>	<u>Glenwood</u>	<u>Golf</u>	<u>Grayslake</u>	<u>Gurnee</u>
1981	0.000	0.000	5.574	0.000	0.070	0.000	1.318
1982	0.000	0.000	5.877	0.000	0.070	0.000	1.446
1983	0.000	0.000	6.116	0.000	0.071	0.000	1.576
1984	0.000	0.000	6.355	1.899	0.071	0.000	1.707
1985	2.057	2.934	6.594	2.043	0.072	0.735	1.839
1986	2.087	2.948	6.687	2.102	0.072	0.764	1.973
1987	2.118	2.995	6.770	2.162	0.073	0.792	2.108
1988	2.149	3.041	6.854	2.221	0.073	0.821	2.244
1989	2.180	3.087	6.937	2.281	0.074	0.849	2.382
1990	2.211	3.134	7.020	2.340	0.074	0.878	2.521
2000	2.496	3.651	7.540	2.860	0.075	1.372	3.844
2010	2.506	3.647	7.670	2.897	0.076	1.543	3.939
2020	2.579	3.738	7.800	3.111	0.076	1.665	4.317
	<u>Hanover Park</u>	<u>Harvey</u>	<u>Harwood Heights</u>	<u>Hazel Crest</u>	<u>Hickory Hills</u>	<u>Highland Park</u>	<u>Highwood</u>
1981	0.000	5.560	1.337	1.216	1.227	5.420	0.602
1982	0.000	5.560	1.342	1.253	1.236	5.440	0.602
1983	0.000	5.650	1.342	1.290	1.245	5.450	0.602
1984	1.055	5.700	1.332	1.337	1.254	5.460	0.602
1985	1.094	5.750	1.321	1.385	1.263	5.470	0.601
1986	1.111	5.760	1.311	1.488	1.272	5.496	0.601
1987	1.129	5.770	1.315	1.591	1.281	5.522	0.601
1988	1.146	5.780	1.320	1.693	1.290	5.548	0.600
1989	1.164	5.790	1.324	1.796	1.299	5.574	0.600
1990	1.182	5.800	1.328	1.899	1.308	5.600	0.599
2000	1.397	6.000	1.353	2.413	1.358	6.250	0.584
2010	1.437	6.150	1.372	2.467	1.368	6.500	0.592
2020	1.641	6.300	1.463	2.677	1.380	6.780	0.646

	<u>Hillside</u>	<u>Hinsdale</u>	<u>Hodgkins</u>	<u>Hoffman Estates</u>	<u>Hometown</u>	<u>Homewood</u>	<u>Ill. Beach State Park</u>
1981	1.270	0.000	0.279	0.000	0.438	0.000	0.065
1982	1.240	0.000	0.280	0.000	0.437	0.000	0.065
1983	1.210	0.000	0.282	0.000	0.436	0.000	0.072
1984	1.200	0.000	0.284	3.207	0.435	3.219	0.072
1985	1.196	2.792	0.332	3.297	0.435	3.235	0.100
1986	1.198	2.790	0.336	3.409	0.434	3.251	0.100
1987	1.200	2.819	0.343	3.576	0.433	3.303	0.100
1988	1.202	2.848	0.350	3.747	0.432	3.355	0.100
1989	1.204	2.877	0.357	3.920	0.431	3.407	0.100
1990	1.206	2.906	0.364	4.095	0.430	3.460	0.100
2000	1.224	3.176	0.407	5.337	0.416	3.746	0.100
2010	1.224	3.174	0.414	5.501	0.425	3.806	0.100
2020	1.224	3.276	0.441	6.114	0.458	4.109	0.100

	<u>Indian Head Park</u>	<u>Interlake Inc.</u>	<u>Itasca</u>	<u>Justice</u>	<u>Kenil- worth</u>	<u>Knollwood- Rondout</u>	<u>LaGrange</u>
1981	0.000	3.870	0.000	1.230	0.455	0.301	1.829
1982	0.000	3.870	0.000	1.240	0.460	0.330	1.833
1983	0.372	3.870	0.000	1.260	0.459	0.340	1.836
1984	0.379	3.870	0.000	1.280	0.458	0.350	1.839
1985	0.386	3.870	0.650	1.300	0.457	0.367	1.842
1986	0.391	3.870	0.660	1.318	0.456	0.384	1.845
1987	0.396	3.870	0.670	1.336	0.460	0.402	1.848
1988	0.400	3.870	0.680	1.354	0.464	0.419	1.850
1989	0.405	3.870	0.690	1.372	0.468	0.437	1.853
1990	0.410	3.870	0.700	1.390	0.473	0.454	1.855
2000	0.430	3.870	0.790	1.780	0.482	0.623	1.826
2010	0.435	3.870	0.820	1.860	0.482	0.676	1.852
2020	0.440	3.870	0.820	1.930	0.482	0.726	1.988

	<u>LaGrange Highlands San. Dist.</u>	<u>LaGrange Park</u>	<u>Lake Bluff</u>	<u>Lake Co. Public Water District</u>	<u>Lake Forest</u>	<u>Lansing</u>	<u>Lemont</u>
1981	0.643	1.346	0.684	0.075	2.885	3.020	0.000
1982	0.648	1.340	0.721	0.078	2.931	3.063	0.000
1983	0.650	1.335	0.750	0.081	2.977	3.106	0.000
1984	0.652	1.332	0.778	0.084	3.023	3.150	0.000
1985	0.658	1.309	0.806	0.087	3.068	3.193	0.478
1986	0.664	1.297	0.829	0.090	3.114	3.237	0.486
1987	0.670	1.290	0.861	0.092	3.160	3.202	0.499
1988	0.676	1.300	0.893	0.095	3.206	3.326	0.512
1989	0.682	1.301	0.925	0.097	3.251	3.371	0.526
1990	0.688	1.303	0.957	0.100	3.574	3.415	0.540
2000	0.703	1.293	1.251	0.120	4.485	3.631	0.622
2010	0.751	1.314	1.277	0.140	4.782	3.701	0.637
2020	0.794	1.414	1.394	0.160	5.091	3.996	0.692
	<u>Leyden Township Service Area</u>	<u>Liberty- ville</u>	<u>Lincoln- shire</u>	<u>Lincoln- wood</u>	<u>Lisle</u>	<u>Lombard</u>	<u>Long Grove</u>
1981	0.970	2.379	0.774	2.487	0.000	0.000	0.000
1982	0.972	2.475	0.839	2.491	0.000	0.000	0.000
1983	0.974	2.544	0.905	2.496	0.000	0.000	0.092
1984	0.976	2.611	0.972	2.500	0.000	0.000	0.160
1985	0.977	2.678	1.040	2.505	0.433	4.279	0.166
1986	0.970	2.747	1.110	2.509	0.646	4.312	0.177
1987	0.972	2.846	1.180	2.513	0.858	4.392	0.188
1988	0.973	2.946	1.252	2.517	1.071	4.473	0.200
1989	0.975	3.047	1.324	2.522	1.283	4.553	0.211
1990	0.977	3.148	1.398	2.526	1.496	4.634	0.222
2000	0.986	4.019	2.063	2.512	3.089	5.541	0.304
2010	1.008	4.108	2.118	2.536	3.415	5.562	0.311
2020	1.087	4.404	2.320	2.659	3.480	5.717	0.340

	Loyola Univ. Medical Center	Lynwood	Lyons	Madden Mental Health Center	Markham	Matteson	Maywood
1981	0.266	0.310	1.183	0.054	1.433	0.000	2.858
1982	0.279	0.340	1.184	0.054	1.467	0.000	2.887
1983	0.312	0.430	1.172	0.054	1.501	0.000	2.884
1984	0.336	0.445	1.160	0.054	1.535	1.591	2.880
1985	0.356	0.448	1.149	0.054	1.569	1.700	2.876
1986	0.381	0.451	1.138	0.054	1.608	1.792	2.871
1987	0.406	0.459	1.139	0.054	1.628	1.885	2.897
1988	0.430	0.467	1.140	0.054	1.648	1.977	2.923
1989	0.455	0.475	1.141	0.054	1.668	2.070	2.949
1990	0.480	0.483	1.142	0.054	1.688	2.162	2.974
2000	0.480	0.524	1.136	0.054	1.756	3.128	3.014
2010	0.480	0.534	1.151	0.054	1.809	3.281	3.050
2020	0.480	0.580	1.238	0.054	1.959	3.566	3.266
	McCook	Melrose Park	Merrion- ette Park	Midlo- thian	Mont- gomery	Morton Grove	Mount Prospect
1981	5.797	6.249	0.160	1.419	0.000	4.264	0.000
1982	5.797	6.273	0.160	1.431	0.000	4.305	0.000
1983	5.797	6.226	0.160	1.444	0.000	4.297	0.000
1984	5.797	6.180	0.160	1.456	0.000	4.290	4.762
1985	5.797	6.136	0.160	1.469	0.000	4.282	4.835
1986	5.728	6.083	0.160	1.482	0.000	4.276	4.909
1987	5.728	6.097	0.160	1.494	0.000	4.315	4.983
1988	5.728	6.111	0.160	1.507	0.000	4.355	5.058
1989	5.728	6.125	0.160	1.520	0.000	4.395	5.133
1990	5.728	6.139	0.160	1.533	2.220	4.435	5.208
2000	5.728	6.152	0.165	1.591	2.790	4.608	5.582
2010	5.728	6.202	0.169	1.618	3.100	4.667	5.702
2020	5.728	6.443	0.182	1.747	3.510	4.680	6.167

	<u>Mundelein</u>	<u>Naper- ville</u>	<u>Niles</u>	<u>Norridge</u>	<u>North Aurora</u>	<u>North- brook</u>	<u>North Chicago</u>
1981	0.000	0.000	5.568	1.487	0.000	5.330	3.991
1982	0.000	0.000	5.648	1.495	0.000	5.418	4.024
1983	0.000	0.000	5.728	1.485	0.000	5.507	4.057
1984	0.000	0.000	5.809	1.476	0.000	5.596	4.090
1985	0.000	7.936	5.890	1.467	0.000	5.685	4.123
1986	1.680	8.274	5.969	1.458	0.000	5.774	4.149
1987	1.720	8.611	6.048	1.465	0.000	5.862	4.174
1988	1.760	8.949	6.127	1.472	0.000	5.951	4.200
1989	1.800	9.286	6.207	1.478	0.000	6.039	4.225
1990	1.840	9.624	6.287	1.485	1.398	6.128	4.251
2000	2.240	15.570	6.642	1.493	1.680	7.192	4.471
2010	2.650	16.184	6.753	1.521	1.842	7.385	4.545
2020	3.050	16.570	7.310	1.635	1.941	7.532	4.965
	<u>North- field</u>	<u>North- lake</u>	<u>North Riverside</u>	<u>Oak Brook</u>	<u>Oak Brook Terrace</u>	<u>Oak Forest</u>	<u>Oak Lawn</u>
1981	1.009	1.981	0.987	0.000	0.000	2.257	6.310
1982	1.065	1.996	0.990	0.000	0.000	2.278	6.380
1983	1.076	2.011	0.989	0.000	0.000	2.299	6.470
1984	1.088	2.026	0.981	0.000	0.000	2.321	6.550
1985	1.110	2.741	0.973	3.102	0.483	2.343	6.620
1986	1.188	2.752	0.966	3.097	0.519	2.365	6.676
1987	1.266	2.762	0.969	3.126	0.555	2.387	6.732
1988	1.345	2.773	0.972	3.155	0.591	2.408	6.788
1989	1.423	2.783	0.975	3.183	0.627	2.430	6.844
1990	1.501	2.794	0.978	3.212	0.663	2.452	6.900
2000	1.578	2.830	0.992	3.467	0.971	2.627	7.180
2010	1.614	2.850	1.008	3.470	1.054	2.701	7.360
2020	1.751	2.900	1.088	3.565	1.084	2.768	7.360

	<u>Oak Park</u>	<u>Olympia Fields</u>	<u>Orland Park</u>	<u>Palatine</u>	<u>Palos Heights</u>	<u>Palos Hills</u>	<u>Palos Park</u>
1981	6.234	0.000	0.000	0.000	1.631	1.740	0.140
1982	6.249	0.000	0.000	0.000	1.701	1.762	0.160
1983	6.265	0.000	3.008	0.000	1.777	1.783	0.170
1984	6.211	0.720	3.203	4.377	1.852	1.804	0.180
1985	6.158	0.751	3.404	4.379	1.923	1.826	0.200
1986	6.103	0.778	3.603	4.374	1.932	1.848	0.264
1987	6.115	0.806	3.806	4.418	1.941	1.871	0.328
1988	6.126	0.834	4.015	4.462	1.950	1.893	0.385
1989	6.138	0.861	4.228	4.505	1.959	1.916	0.386
1990	6.150	0.889	4.446	4.549	1.968	1.938	0.386
2000	6.178	1.049	5.724	4.760	2.120	2.210	0.385
2010	6.271	1.076	5.871	4.845	2.163	2.210	0.394
2020	6.427	1.168	6.386	5.237	2.163	2.210	0.427

	<u>Park City</u>	<u>Park Ridge</u>	<u>Phoenix</u>	<u>Posen</u>	<u>Prospect Heights</u>	<u>Republic Steel Corp.</u>	<u>Richton Park</u>
1981	0.345	4.853	0.231	0.440	0.000	1.512	0.000
1982	0.352	4.874	0.232	0.450	0.000	1.512	0.000
1983	0.360	4.841	0.230	0.460	0.000	1.512	0.000
1984	0.366	4.808	0.228	0.471	0.580	1.512	0.000
1985	0.369	4.777	0.227	0.481	0.586	1.512	0.984
1986	0.372	4.742	0.225	0.492	0.592	1.512	1.013
1987	0.379	4.759	0.226	0.502	0.598	1.512	1.043
1988	0.386	4.776	0.227	0.513	0.604	1.512	1.072
1989	0.393	4.793	0.228	0.524	0.610	1.512	1.102
1990	0.401	4.811	0.229	0.535	0.616	1.512	1.133
2000	0.468	4.896	0.231	0.590	0.651	1.512	1.473
2010	0.477	4.965	0.234	0.602	0.668	1.512	1.512
2020	0.520	5.338	0.253	0.652	0.729	1.512	1.641

	<u>River- dale</u>	<u>River Forest</u>	<u>River Grove</u>	<u>River- side</u>	<u>River- woods</u>	<u>Robbins</u>	<u>Rolling Meadows</u>
1981	3.037	1.630	1.385	0.939	0.097	1.323	0.000
1982	3.043	1.630	1.387	0.938	0.151	1.335	0.000
1983	3.049	1.630	1.374	0.938	0.219	1.329	0.000
1984	3.056	1.650	1.361	0.937	0.264	1.325	2.799
1985	3.063	1.650	1.349	0.936	0.343	1.319	2.818
1986	3.062	1.654	1.336	0.935	0.399	1.314	2.821
1987	3.063	1.658	1.338	0.934	0.455	1.323	2.853
1988	3.062	1.662	1.340	0.933	0.510	1.331	2.885
1989	3.062	1.666	1.342	0.932	0.566	1.339	2.916
1990	3.063	1.670	1.344	0.931	0.622	1.347	2.949
2000	3.050	1.690	1.347	0.911	0.769	1.352	3.111
2010	3.082	1.720	1.366	0.928	0.840	1.380	3.169
2020	3.267	1.750	1.458	0.999	0.900	1.490	3.382

	<u>Roselle</u>	<u>Rosemont</u>	<u>Round Lake Beach</u>	<u>Round Lake Park</u>	<u>Sauk Village</u>	<u>Schaum- burg</u>	<u>Schiller Park</u>
1981	0.000	1.790	0.000	0.000	0.000	0.000	2.525
1982	0.000	1.870	0.000	0.200	0.000	0.000	2.540
1983	0.000	2.060	1.000	0.220	0.975	0.000	2.527
1984	1.841	2.270	1.200	0.240	1.005	7.409	2.514
1985	1.880	2.500	1.300	0.260	1.035	7.705	2.501
1986	1.918	2.552	1.340	0.268	1.063	7.981	2.482
1987	1.956	2.604	1.380	0.276	1.091	8.259	2.491
1988	1.995	2.656	1.420	0.284	1.119	8.540	2.500
1989	2.033	2.708	1.460	0.292	1.147	8.823	2.508
1990	2.072	2.760	1.500	0.300	1.175	9.108	2.516
2000	2.450	3.000	2.000	0.400	1.515	10.823	2.513
2010	2.468	3.000	2.000	0.500	1.568	11.054	2.535
2020	2.562	3.000	2.000	0.600	1.617	12.002	2.639

	<u>Skokie</u>	<u>South Holland</u>	<u>South Palos Sanit. District</u>	<u>South Stickney Sanit. District</u>	<u>Steger</u>	<u>Stickney</u>	<u>Stone Park</u>
1981	13.644	2.915	0.000	2.576	0.000	2.210	0.450
1982	13.657	2.939	0.000	2.583	0.000	2.220	0.450
1983	13.520	2.964	0.000	2.588	0.000	2.230	0.446
1984	13.387	2.988	0.170	2.593	0.000	2.240	0.441
1985	13.256	3.013	0.171	2.598	0.000	2.250	0.436
1986	13.128	3.038	0.173	2.602	0.000	2.260	0.432
1987	13.140	3.062	0.175	2.605	0.000	2.270	0.432
1988	13.152	3.087	0.176	2.607	0.000	2.280	0.433
1989	13.165	3.112	0.178	2.609	0.000	2.290	0.433
1990	13.177	3.137	0.180	2.611	0.000	2.300	0.434
2000	13.140	3.267	0.196	2.538	0.000	2.400	0.428
2010	13.257	3.337	0.202	2.594	0.000	2.500	0.435
2020	13.916	3.617	0.209	2.795	0.000	2.600	0.462
	<u>Stream-wood</u>	<u>Summit</u>	<u>Thornton</u>	<u>Tinley Park</u>	<u>U.S. Steel Corp. S. Works</u>	<u>Vernon Hills</u>	<u>Villa Park</u>
1981	0.000	1.348	0.380	2.630	3.878	0.000	0.000
1982	0.000	1.349	0.380	2.750	3.878	0.000	0.000
1983	0.000	1.335	0.380	2.860	3.878	0.000	0.000
1984	0.789	1.322	0.380	2.970	3.878	0.000	0.000
1985	0.854	1.309	0.380	3.080	3.878	1.244	2.302
1986	0.917	1.296	0.380	3.194	3.878	1.290	2.312
1987	1.013	1.297	0.380	3.308	3.878	1.350	2.321
1988	1.100	1.297	0.380	3.422	3.878	1.411	2.330
1989	1.209	1.298	0.380	3.536	3.878	1.473	2.340
1990	1.309	1.298	0.380	3.650	3.878	1.536	2.349
2000	1.868	1.279	0.380	4.485	3.878	2.092	2.399
2010	1.950	1.291	0.413	4.603	3.878	2.151	2.397
2020	2.288	1.362	0.450	4.994	3.878	2.362	2.452

	<u>Warren- ville</u>	<u>Waukegan</u>	<u>West Chicago</u>	<u>West- chester</u>	<u>Western Springs</u>	<u>Westmont</u>	<u>Wheaton</u>
1981	0.000	11.650	0.000	1.800	0.000	0.000	0.000
1982	0.000	11.770	0.000	1.828	0.000	0.000	0.000
1983	0.000	11.890	0.000	1.835	0.000	0.000	0.000
1984	0.000	11.990	0.000	1.842	1.200	0.000	0.000
1985	0.000	12.166	2.184	1.849	1.200	1.525	5.534
1986	0.000	12.289	2.326	1.854	1.220	1.565	5.609
1987	0.000	12.412	2.469	1.878	1.240	1.628	5.684
1988	0.000	12.536	2.611	1.902	1.260	1.691	5.759
1989	0.000	12.659	2.754	1.926	1.280	1.754	5.834
1990	0.000	12.782	2.896	1.950	1.300	1.818	5.909
2000	0.210	14.322	4.331	2.050	1.300	2.578	6.739
2010	0.442	15.683	4.546	2.090	1.300	2.580	6.747
2020	0.808	17.044	4.672	2.254	1.400	3.336	6.929
	<u>Wheeling</u>	<u>Wildwood- Gages Lake</u>	<u>Willow- brook</u>	<u>Willow Springs</u>	<u>Wilmette</u>	<u>Winnetka</u>	<u>Winthrop Harbor</u>
1981	0.000	0.000	0.000	0.721	3.896	2.980	0.377
1982	0.000	0.000	0.000	0.764	3.901	2.996	0.384
1983	0.000	0.000	0.000	0.889	3.862	3.012	0.391
1984	2.497	0.000	0.000	0.896	3.824	3.028	0.398
1985	2.690	0.594	0.466	0.903	3.786	3.044	0.406
1986	2.774	0.605	0.473	0.909	3.750	3.059	0.413
1987	2.858	0.616	0.481	0.914	3.755	3.074	0.420
1988	2.942	0.628	0.489	0.920	3.759	3.090	0.427
1989	3.026	0.639	0.496	0.925	3.764	3.105	0.434
1990	3.110	0.650	0.504	0.931	3.768	3.120	0.442
2000	3.650	0.758	0.580	0.943	3.769	3.280	0.485
2010	3.716	0.770	0.586	0.950	3.821	3.440	0.497
2020	4.005	0.839	0.605	0.975	4.111	3.600	0.543

	<u>Wisconsin Steel</u>	<u>Wooddale</u>	<u>Woodridge</u>	<u>Worth</u>	<u>Zion</u>
1981	1.870	0.000	0.000	1.059	1.816
1982	1.870	0.000	0.000	1.090	1.861
1983	1.870	0.000	0.000	1.097	1.907
1984	1.870	0.000	0.000	1.104	1.952
1985	1.870	1.040	2.398	1.111	1.998
1986	1.870	1.072	2.416	1.120	2.046
1987	1.870	1.104	2.461	1.129	2.093
1988	1.870	1.136	2.507	1.138	2.141
1989	1.870	1.168	2.553	1.147	2.188
1990	1.870	1.200	2.599	1.156	2.236
2000	1.870	1.599	3.014	1.204	2.797
2010	1.870	1.764	3.024	1.214	2.864
2020	1.870	1.817	3.112	1.223	3.137

APPENDIX A (CONTINUED)

Allocation of Lake Michigan
Water to MSDGC for Direct Diversion

All allocated quantities are shown in cubic feet per second (cfs)

Metropolitan Sanitary District of Greater Chicago

	<u>Lockage</u>	<u>Leakage</u>	<u>Navigational Make up Water</u>	<u>Discretionary Dilution Water</u>	<u>Total</u>
1981	130	30	95	320	575
1982	130	30	95	320	575
1983	130	30	95	320	575
1984	130	30	95	320	575
1985	130	30	95	320	575
1986	130	30	55	320	535
1987	130	30	55	320	535
1988	130	30	55	320	535
1989	130	30	55	320	535
1990	130	30	55*	320	535
2000	130	30	30	320**	510
2010	130	30	30	101	291
2020	130	30	30	101	291

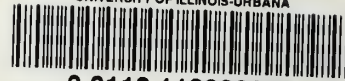
* Allocation for Navigational Make-Up Water remains at 55 cfs through 1999.

** Discretionary dilution allocation reduced to 101 cfs in the year 2001.

APPENDIX B SUMMARY OF ILLINOIS' LAKE MICHIGAN DIVERSION

	<u>Total domestic alloca- tion (MGD)</u>	<u>Total domestic alloca- tion (cfs)</u>	<u>Consump- tive Use Adjust- ment (cfs)</u>	<u>Sub- Total domestic pumpage (cfs)</u>	<u>Total direct diver- sion (cfs)</u>	<u>Alloca- tion to N. Shore San. Dist. (cfs)</u>	<u>Reserve for Storm- water Run- off (cfs)</u>	<u>Other Reserve</u>	<u>Total Lake Michigan Diversion</u>
1981	1088.277	1683.565	0163.678	1519.887	0575.000	0000.480	0656.000	0448.633	3200.000
1982	1091.526	1688.591	0164.019	1524.572	0575.000	0000.480	0657.000	0442.948	3200.000
1983	1091.196	1688.080	0163.625	1524.455	0575.000	0000.480	0658.000	0442.065	3200.000
1984	1156.075	1788.448	0165.350	1623.098	0575.000	0000.480	0659.000	0342.422	3200.000
1985	1224.549	1894.377	0164.995	1729.384	0575.000	0000.480	0660.000	0235.138	3200.000
1986	1222.517	1891.233	0163.917	1727.316	0535.000	0000.480	0661.000	0276.204	3200.000
1987	1228.896	1901.102	0164.288	1736.814	0535.000	0000.480	0662.000	0265.706	3200.000
1988	1235.464	1911.263	0164.684	1746.579	0535.000	0000.480	0663.000	0254.941	3200.000
1989	1241.917	1921.246	0165.140	1756.106	0535.000	0000.480	0664.000	0244.414	3200.000
1990	1267.587	1960.957	0165.482	1795.475	0535.000	0000.480	0665.000	0204.045	3200.000
2000	1327.062	2052.965	0167.834	1885.131	0510.000	0000.480	0670.000	0134.389	3200.000
2010	1341.608	2075.468	0168.590	1906.878	0291.000	0000.480	0675.000	0326.642	3200.000
2020	1372.098	2122.636	0171.219	1951.417	0291.000	0000.480	0680.000	0277.103	3200.000

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